

COMPARISON OF LAPAROSCOPIC VS OPEN REPAIR OF VENTRAL HERNIA WITH MESH

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Abstract

Background: Ventral hernias (VH) occur as a result of weakness in the musculofascial layer of the anterior abdominal wall. The most popular classification is: congenital, acquired, incisional and traumatic. A successful series of laparoscopic repair for VH was done by LeBlanc in 1993. Laparoscopic repair was applied to the ventral hernias, with the expectation of earlier recovery, fewer postoperative complications, and decreased recurrence rates. The Objective is to compare the outcomes after open and laparoscopic ventral hernia repair. **Materials and Methods:** It is prospective study involved 60 patients with ventral hernia, were subjected either to repair by laparoscopy or to open repair. The open surgical operations were performed by the retro-rectus mesh repair, whereas the laparoscopic repairs were performed using the intra-peritoneal on lay dual mesh (IPOM) repair technique. **Result:** Incisional hernia was the most common disease (41.67%). Followed by umbilical hernia (33.33%) in the studied patients. Compared to open repair, laparoscopic repair is associated with shorter duration of surgery (laparoscopic -91 minutes versus open-115 minutes). The average pain score was 2.67 in laparoscopic repair when compared to open repair with 4.87 score on postoperative day 1. Duration of hospital stay was significantly shorter for laparoscopic repair than for open hernia repair (3.43 days versus 4.53 days). **Conclusion:** The findings demonstrate that laparoscopic ventral hernia repair in our experience was safe and resulted in shorter operative time, fewer complications; shorter hospital stays, and earlier returns to daily activity. Hence, it should be considered as the procedure of choice for ventral hernia repair.

INTRODUCTION

Hernia is derived from the Latin word for rupture. A hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls.^[1] Hernia formation is a multifactorial process involving endogenous factors including age, gender, anatomic variations, and inheritance and exogenous factors such as smoking, comorbidity, and surgical factors.^[2]

Abdominal wall hernias are familiar surgical problem. Millions of patients are affected each year presenting with most commonly with primary ventral, incisional, and inguinal hernias. Hernia may be either symptomatic or asymptomatic, and commonly cause pain or are aesthetically distressing. These problems, coupled with the risk of obstruction & incarceration, are the most common

reasons for patients seeking surgical repair of hernias.

Advances made in the basic and clinical sciences have allowed for the better understanding of pathophysiology of hernia formation. It is known that based on Pascal's principle of the hydrostatic forces and the law of LaPlace that a hernia will continue to enlarge over the time if not treated. Increased intra-abdominal pressure will exert its greatest pressure on the portion of the wall that is thinnest, the wall thins at this point, and the diameter increases. This positive feedback loop virtually results in continued progression of hernia. Furthermore review of natural history of hernias suggests that the incisional hernias do not develop in the immediate postoperative period. Depending on the surgical procedure & techniques used at the time of initial repair, recurrence rates as high as 50%

have been documented for both ventral and incisional hernias. It has also been shown that the recurrences typically occur more rapidly than the initial hernia developed.

With no substantial co-morbid conditions, the presence of ventral hernia is an indication for the repair. Elective repair is undertaken to alleviate symptoms and to prevent hernia incarceration. Although the actual percentage is not known, it is estimated that of about 10% of all ventral hernias can result in complications like incarceration.

As the result of surgical innovation, the field of hernia has improved and evolved and has been benefited significantly from technologic improvements. The tension-free repair of hernia is one of the key concepts in revolutionizing the hernia surgery. The use of prosthetic mesh to repair the fascial defect has decreased in the recurrence rates of ventral and incisional hernias. Recently, the laparoscopic approaches for hernia have increased the options and approaches for repairing the defect.

To achieve outcomes in comparison with the open repair, laparoscopic repair of hernia demands for significant expertise and compare the intra and post operative differences between open and laparoscopic repair group during the operation and hospital stay.

MATERIALS AND METHODS

The study was conducted on patients admitted at SDM Medical College, Dharwad. A prospective, observational study was planned. The study was undertaken on 60 patients of ventral hernias selected from cases admitted to our hospital during the year December 2016 to June 2018 were subjected to either repair by open or laparoscopy method. The study was approved by ethics committee of the hospital and informed written consent was obtained from all patients.

Inclusion Criteria

- Age > 18 years
- Who give informed written consent
- Ventral hernias (epigastric, incisional, umbilical and paraumbilical)
- Undergoing elective surgery for ventral hernia

Exclusion Criteria

- Age < 18 years
- Patients with inguinal, femoral, spigelian, lumbar and obturator hernias are excluded
- Patients with complicated ventral hernia (obstructed, strangulated)
- Patients with severe cardiopulmonary diseases
- Patients with multiple abdominal scars
- Patients with cirrhosis of liver and/or ascites and other co-morbid conditions

Sample Size Estimation

SD of duration of surgery in laparoscopic group – 40.05 (S1)

SD of duration of surgery in open group- 30.29 (S2)

Mean Difference – 25.83

N= 30 each group

FORMULA

$N = 2S^2 (z_{\alpha} + z_{\beta})^2 / d^2$

$S = s_1 + s_2 / 2$

ZAlpha= 1.96 at 5% alpha error

ZBeta = 0.84 at 80% Power

The patients are studied as per proforma attached and master chart was made for the cases studied to make the report brief. All patients were clinically diagnosed and all patients included in the study underwent surgery following preoperative investigation in the form of Hb%, RBS, FBS, PPBS, Blood urea, serum creatinine, urine for albumin, sugar and microscopy, ECG, chest X-ray and HRUSG (high resolution ultrasonography) of the abdominal wall for assessment of the hernia size and site.

All patients underwent surgical procedure after following preoperative preparation. Informed written consent was obtained after explaining the surgical procedure and its results. Patient was kept nil by mouth after 10:00 pm on the previous night of surgery. On operative table betadine scrub given to anterior abdominal wall preoperatively. Foley's catheter was put for patients with lower abdominal ventral hernia repair and nasogastric tube for upper abdominal hernia repair. All patients received one dose of preoperative antibiotic, 1gm of Cefazolin (3rd generation cephalosporins) during immediately after induction of anaesthesia and dose repeated as and when duration exceeded more than two hours. Patients were operated either under spinal anaesthesia or general anaesthesia. Patients underwent polypropylene mesh repair -Retro rectus repair in open method. Laparoscopically mesh (dual layer mesh) was placed intra-peritoneal after reduction of hernia.

Open Method

Skin incision was made according to site and size of defect, a subcutaneous flap was raised up to 3 to 5 cm around the defect and after the hernia sac was found, the contents were reduced. Then plane created between posterior rectus sheath and muscle above the arcuate line and rectus muscle and peritoneum below the arcuate line. The posterior rectus sheath and peritoneum were closed primarily with 1:0 absorbable suture, then polypropylene mesh of suitable size with a minimum of 5 cm overlap beyond the margin of the defect and were placed between posterior rectus sheath/peritoneum and rectus muscle. The anterior rectus sheath was closed with polypropylene without tension after placing suction drain of 16 F. Then the skin was closed either with 2-0 ethilon or skin staplers.

Laparoscopic repair of ventral hernia

In laparoscopic repair of ventral hernia, bowel was prepared to make more room in the abdominal cavity, the surgeon stands left of the patient with the camera man on his right. The monitor was placed opposite to the surgeon and the instrument trolley was towards the foot end of the patient. pneumoperitoneum created through Palmer's point, 2 to 3 cm below the left costal margin in the mid-clavicle line with Veress needle.

Generally three trocars are adequate for small to moderate size hernias. 10 mm trocars at palmer point and other two 5 mm trocars at left lumbar and iliac fossa along the anterior axillary line. Adhesions of the abdominal contents to the hernial sac and the surrounding abdominal wall are lysed and the contents of the hernia are reduced. Hernia sac is excised as much as possible to avoid seroma formation. Tran facial sutures applied with poly propylene 1-0 suture with help of cobbler needle to obliterate the defect after reducing pneumoperitoneum partially. Size of the defect measured and appropriate size of dual mesh covering 4 cms to 5 cms beyond defect was selected. Mesh is rolled and introduced intraperitoneal through 10 mm trocar and mesh is unfolded so that white side (polyester) facing abdominal wall and blue side coated with polyurethane facing viscera. Mesh is fixed trans-facially in the middle with sutures provided along with mesh with help of cobbler needle. Absorbable tackers used to fix the mesh all around and corners. Hemostasis was achieved before the removal of the trocars. All 10-mm trocar fascial defects were closed. Skin defects were closed with skin staplers. Catheter and rylestube removed before extubating

the patient. Compressive dressing is placed over the hernia defect to prevent seroma formation. Both the group patients were followed up post operatively until the day of discharge.

Statistical Analysis:

The Statistical software namely SPSS 20.0 used for the analysis of the data and Microsoft Word and Excel have been used to generate graphs, tables etc. Student t-test has been used to find the significance of quantitative partnership square test used for qualitative parameters.

RESULTS

Out of 60 patients 36 were female patients comprising of 60% of the study group and males were 24 comprised of 40% of the study group. Males underwent open repair more when compared to laparoscopic repair (43.33% vs 36.67%) whereas women underwent laparoscopic repair more when compared to open repair (63.33% vs 56.67%).

Majority of the patients are in the age group of 41-50 years accounting to 33.33 % of total cases. 51-60 years age group most commonly underwent laparoscopic repair (36.67%). whereas 41-50 years underwent open repair more commonly (40%).

The mean age who underwent lap repair was 48.10 years and in open group the mean age was 48.13 years. Incisional hernia was the most common disease (41.67%). Followed by umbilical hernia (33.33%). In laparoscopic group the most common type of hernia repaired was umbilical hernia (46.67%). whereas in the open group incisional hernia was the commonest (40%) [Table 1].

Table 1: Comparison of two study groups (Lap and Open repair) with diagnosis

Diagnosis	Lap repair	%	Open repair	%	Total	%
Epigastric hernia	0	0.00	10	33.33	10	16.67
Incisional hernia	13	43.33	12	40.00	25	41.67
Paraumbilical hernia	3	10.00	2	6.67	5	8.33
Umbilical hernia	14	46.67	6	20.00	20	33.33
Total	30	100.00	30	100.00	60	100.00

Chi-square=13.4401P=0.0040*

*p<0.05

In both the groups hypertension was the most commonly associated co-morbidity. [Table 2]

Table 2: Comparison of two study groups (Lap and Open repair) with presence of co-morbidities

Co-morbidities	Lap repair	%	Open repair	%	Total	%	p-value
Diabetic mellitus type II	4	13.33	0	0.00	4	6.67	0.0520
Hypertension	7	23.33	6	20.00	13	21.67	0.7542
COPD	0	0.00	1	3.33	1	1.67	1.0000
Hypothyroidism	4	13.33	1	3.33	5	8.33	0.3500
IHD	0	0.00	1	3.33	1	1.67	1.0000
HBSAG positive	1	3.33	0	0.00	1	1.67	1.0000
None	19	63.33	22	73.33	41	68.33	0.4050

This study showed no drain was placed in the laparoscopic group whereas all the cases who underwent open procedure had a post operative drain (statistically significant with p =0.001).

This figure shows the average time taken for laparoscopic repair was 91.0 minutes and open repair took ~115 minutes (p value = 0.0131 statistically significant).

Table 3: Comparison of two study groups (Lap and Open repair) with mean duration of surgery (in minutes) by independent t test.

Summary	Lap repair	Open repair	Total	t-value	p-value
Mean	91.00	114.83	102.92	-2.5585	0.0131*
SD	40.35	31.22	37.74		

SE	7.37	5.70	4.87		
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*p<0.05

This table shows the average initiation of oral intake was 492 minutes in laparoscopic group whereas it was 456 minutes in open repair but statistically not significant (p = 0.4568). The average postoperative day 1 pain score was 2.67 in laparoscopic repair when compared to open repair with 4.87 as score using visual analogue scale. Statistically significant with p value = 0.0001. [Table 4]

Table 4: Comparison of two study groups (Lap and Open repair) with mean post operative day1 pain scores by independent t test

Summery	Laprepair	Openrepair	Total	t-value	p-value
Mean	2.67	4.87	3.77	-7.1602	0.0001*
SD	1.30	1.07	1.62		
SE	0.24	0.20	0.21		

The average hospital stay post hernia repair was 3.43 days in laparoscopic repair and 4.53 days in open repair group which was statistically significant P = 0.0034. [Table 5]

Table 5: Comparison of two study groups (Lap and Open repair) with mean post operative duration of hospital stay by independent t test

Summery	Laprepair	Openrepair	Total	t-value	p-value
Mean	3.43	4.53	3.98	-3.0545	0.0034*
SD	1.17	1.59	1.49		
SE	0.21	0.29	0.19		

DISCUSSION

Ventral hernias are one of the most common problems confronting general surgeons. Incisional hernia is a common long-term complication of abdominal surgery and is estimated to occur in 3% to 13% of laparotomy incisions.^[3,4]

Ventral hernia is a very common condition presenting to our hospital, so there was a need to study the disease with respect to the various presentations and also to determine the best modality of treatment in our set-up.

Laparoscopic ventral hernia repair was started by Le Blanc I 1993. After that, evaluation were done to make laparoscopic surgery easier and safer for ventral hernia repair. Discussion is mainly concentrated on intra operative and immediate post-operative parameters between patients who underwent laparoscopic repair and open repair.

Out of 60 patients 36 were female patients comprising of 60% of the study group and males were 24 comprised of 40% of the study group. This study showed that majority of the patients are in the age group of 41-50 years accounting to 33.33 % of total cases.

Incisional hernia was the most common disease (41.67%). Followed by umbilical hernia (33.33%) in the studied patients. But in laparoscopic group the most common type of hernia repaired was umbilical hernia (46.67%). Whereas in the open group incisional hernia was the commonest (40%).

In both the groups hypertension was the most commonly associated co-morbidity and the mean age is comparable in both the groups. The results of our prospective study revealed that, as compared to open repair, laparoscopic repair is associated with shorter duration of surgery (laparoscopic -91 minutes

vs open-115 minutes), reduced post-operative analgesic requirement and antibiotic requirement.

Coming to the intra-operative parameters, no drain was placed in the laparoscopic repair group whereas all the patients in open repair had a drain placed (statistically significant p value = 0.001) hence with the use of the laparoscopic approach, large incisions and drain placement can be avoided reducing the morbidity related to the surgical wound. There were no intra operative complications noted in both the groups. The average initiation of oral intake was 492 minutes in laparoscopic group whereas it was 456 minutes in open repair maybe attributed to the patients undergoing laparoscopic repair under general anaesthesia but however it was statistically not significant (p = 0.4568).

The average pain score was 2.67 in laparoscopic repair when compared to open repair with 4.87 score on postoperative day 1 using visual analogue scale. Statistically significant with p value = 0.0001.

Duration of hospital stay was significantly shorter for laparoscopic repair than for open hernia repair (3.43 days vs 4.53 days). The reasons for this is because of extensive dissection carried out in the open hernia repair which causes more pain, longer duration of surgery, requirement of suction drain for longer period of time and late return to the normal daily activity and discharge.

Our study results were comparable to the studies carried out by Mehmet et al Carbajo Ramshaw and M Porecha.^[5-8]

CONCLUSION

Laparoscopic ventral hernia repair provides lesser post-operative pain, lesser complications, shorter hospital stay and lesser economic impact as they returned to work early. Thus patients have less morbidity and improved quality of life.

Laparoscopic repair may be considered a primary approach for most ventral and incisional hernias unless contraindicated for laparoscopy. Open hernia repair which is associated with prolonged hospital stay and post operative pain was seen in our study too.

Although delayed post operative complication like seroma, surgical site infection and recurrences are not assessed due to limited study period with the benefits of laparoscopy it will be prudent to recommend laparoscopic repair as the first line of management for incisional hernia where the facilities and trained expertise were available.

Thus management of ventral hernia with open method can be narrowed down to only cases which are complicated with multiple adhesions or irreducible, incarcerated, strangulated hernia.

REFERENCES

1. Townsend RC, Beauchamp BD, Mattox MEK. Clinical surgery of hernia. Sabiston Textbook of Surgery, 19th Edition, Volume II, Elsevier. 2016:1092.
2. Jansen PL, Mertens PP, Klinge U, Schumpelick V. The biology of hernia formation. *Surgery*. 2004;136(1):1-4.
3. Read RC. The Development of Surgical herniography; *Surgical clinics of North America* 1984; 64:185 - 196 .
4. Mudge M, Hughes LE. Incisional hernia: a 10-year prospective study of incidence and attitudes. *Br J Surg*. 1985;72(1):70-1.
5. Mehmet Zafer Sabuncuoğlu et al. Laparoscopic and open incisional hernia repair: A prospective randomized study. *Am J Exp Clin Res* 2015;2(3):121-126.
6. Carbajo MA, Martín D, Olmo JC, Blanco JI, Cuesta C, Vaquero C, Inglada L. Laparoscopic treatment versus open surgery in the solution of major incisional and abdominal wall hernias with mesh. *Surg Endosc*. 1999;13:250-2.
7. Ramshaw BJ, Esartia P, Schwab J, Mason EM, Wilson RA, Duncan TD, Promes J: Comparison of laparoscopic and open ventral herniorrhaphy. *Am Surg*. 1999;65:827-31
8. M Porecha, S Mehta, A Thanthvalia, D Udani. Comparative Study of Laparoscopic versus Open Ventral Hernia Repair. *The Internet Journal of Surgery*. 2009: 22(2).