



## A RANDOMIZED ANALYSIS BETWEEN LAPAROSCOPIC AND OPEN VENTRAL HERNIA REPAIR

### General Surgery

**Dr Suresh Kumar Rulaniya** Resident Registrar, Vivekananda institute of medical sciences, Ramakrishna Mission Seva Prathisthan, Kolkata

**Dr Soumitra Chandra\*** Associate Professor, Vivekananda institute of medical sciences, Ramakrishna Mission Seva Prathisthan, Kolkata \*Corresponding Author

### ABSTRACT

**Background:** Surgery is the mainstay of treatment for ventral hernias including primary repair, open repair with mesh, and laparoscopic repair with mesh. The aim of this study is to compare the outcome of laparoscopic repair and conventional open repair in the treatment of ventral hernia.

**Methods:** The study was a prospective, comparative, randomised study and Subjects were selected from all patients coming to the Opd of our department of surgery from Oct 2016 to Jan 2018 with total 40 sample size. Sampling Techniques by the help of computer generated random numbers by the process of randomization.

**Results:** We were compare operative time, post-operative pain, duration of hospitalisation, time to return to normal activity, cosmesis and complications (infection, seroma, hematoma) and derived P-values between the open and laparoscopic repair and found better in patients undergoing laparoscopic repair.

**Conclusions:** We conclude that laparoscopic surgery is minimally invasive technique for treatment of ventral hernia as compared to open repair. It is associated with much less pain in the post operative period. It also provides a more satisfactory alternative to open surgery because of better cosmesis, reduced hospitalisation and earlier return of patient to daily activities, with no significant differences in short term follow up.

### KEYWORDS

Laparoscopic Mesh Repair, Open Repair, Ventral Hernia

### INTRODUCTION

Ventral hernias comprise the second most common types in the world. Incisional hernias present a challenge even for the experienced surgeon, because of the high incidence of morbidity and recurrence. Wound infection, malnutrition, morbid obesity, chronic cough, prostatism and larger incisions are considered as risk factors for developing incisional hernia. Traditional repairs require laparotomy with suture approximation of the strong fascial tissues on either side. But the recurrence rate was very high on long term follow up. The reason for the under lying problem was that in all sutured repairs, the repair is under tension and this increases the risk of ischemia, suture cut through and failure. From sutured repairs, the concept has slowly moved towards prosthesis with much reduced recurrence rate of 12-24%. Unfortunately, positioning of the mesh makes it necessary to perform an extensive surgical dissection of soft tissues. This is associated with increased incidence of postoperative pain, seromas, hematomas and wound infection.

In the present study we aim to compare the outcome of laparoscopic repair and conventional open repair in the treatment of ventral hernia.

### OBJECTIVES OF THE STUDY:

To compare open ventral hernia repair with laparoscopic ventral hernia with regard to the following factors:

- 1) To compare the operation time.
- 2) To compare the post-operative complications:
  - Pain.
  - Infection.
  - Seroma.
  - Haematoma.
  - Necrosis.
  - Any other complications.
- 3) To compare the length of post-operative hospital stay.
- 4) To compare return to normal activity.
- 5) To compare cosmesis.

### MATERIALS AND METHODS:

**Study Design:** The study was a prospective, comparative, randomised study and Subjects were selected from all patients coming to the Opd of our department from Oct 2016 to Jan 2018 with total 40 sample size. Sampling Techniques by the help of computer generated random numbers by the process of randomization.

### Inclusion Criteria:

- Patients presenting with ventral hernias and managed in our hospital with mesh repair was included after taking a written consent.
- Adult age group.

### Exclusion Criteria:

- Presence of infection and peritonitis,
- Patient with Cardiac disease
- All Pregnant women
- Spigelian hernia.
- Lumbar hernia.
- Obstructed hernia.
- Patients with not fit for anaesthesia
- Pediatric age group

### Methodology:

#### Intervention:

All patients underwent a thorough history taking and clinical evaluation as per proforma. All the patients has undergone the routine blood investigations and in our study we have done ultrasound abdomen for all our patients to know the size, number of defects, contents and any other abdominal pathology. Pre-anesthetic check up and operative fitness obtained

Patients with ventral hernia were selected on the basis of random number generated by the computer.

**Operative procedure:** Either conventional open or laparoscopic surgery was done as per the group to which the patient belonged.

### Post operative management:

- All the patients are ambulated within 12 hrs of surgery and are encouraged for oral feeds.
- The wounds were inspected for any seroma, hematoma or any infection.
- In open group daily drain output was monitored and recorded.
- Drains were removed on 5th to 6th post-operative day, after the output was significantly low.
- Patients were discharged after complete ambulation and tolerating normal diet.
- After discharge, patients were followed up at 1 week, 1 month, 3 month intervals.

### Statistical Methods:

Categorical variables are expressed as Number of patients and percentage of patients and compared across the groups using Pearson's Chi Square test for Independence of Attributes.

Continuous variables are expressed as Mean and Standard Deviation and compared across the 2 groups using Mann-Whitney U test. The statistical software SPSS version 20 has been used for the analysis. An alpha level of 5% has been taken, i.e. if any p value is less than 0.05 it has been considered significant.

**RESULT AND ANALYSIS:**

The maximum number of patients in open group i.e 13 (65%) are in the age group of 41- 60 yrs, and in the laparoscopy group they are also in the age group of 41-60 yrs i.e 8 (40%).

The study shows that the majority of the patients are in the age between 41 years and 60 years.

16 patients of laparoscopic group and 16 patients of open group were females, 4 patients of laparoscopic group and 4 patients of open group were males, totally 80% patients in this study are females.

P value is 1.000 which is statistically not significant.

**Table 1: Duration of surgery and treatment group**

Procedure		Duration Of Opration (in Min)
Open	Mean	88.75
	Std Diviation	12.34
Laproscopy	Mean	93.25
	Std Diviation	14.44
p Value		0.369
Significance		Not Significant

The mean duration of surgery in open group is 88.75 minutes while in laparoscopy group it is

93.25 minutes. The P value is 0.369, which is statistically not significant

In present study mean pain score was 3.70(+/-0.47) in open group as compared to 1.75(+/-0.44) in laparoscopic group. The p value is <0.001 which is statistically significant.

**Table 2: Postoperative complications-Wound Infection and different parameters**

Wound Infection	Procedure				Total		p Value	Significance
	Open		Laparoscopy		Number (n)	Percentage (%)		
	Number (n)	Percentage (%)	Number (n)	Percentage (%)				
No	14	70%	19	95%	33	82.5%	0.037	Significant
Yes	6	30%	1	5%	7	17.5%		
<b>Total</b>	20	100%	20	100%	40	100%		
Seroma	Procedure				Total		p Value	Significance
	Open		Laparoscopy		Number (n)	Percentage (%)		
	Number (n)	Percentage (%)	Number (n)	Percentage (%)				
No	10	50%	19	95%	29	72.5%	0.003	Significant
Yes	10	50%	1	5%	11	27.5%		
<b>Total</b>	20	100%	20	100%	40	100%		
Haematoma	Procedure				Total		p Value	Significance
	Open		Laparoscopy		Number (n)	Percentage (%)		
	Number (n)	Percentage (%)	Number (n)	Percentage (%)				
No	16	80%	20	100%	36	90%	0.106	Not Significant
Yes	4	20%	0	0%	4	10%		
<b>Total</b>	20	100%	20	100%	40	100%		
Skin Necrosis	Procedure				Total		p Value	Significance
	Open		Laparoscopy		Number (n)	Percentage (%)		
	Number (n)	Percentage (%)	Number (n)	Percentage (%)				
No	16	80%	20	100%	36	90%	0.106	Not Significant
Yes	4	20%	0	0%	4	10%		
<b>Total</b>	20	100%	20	100%	40	100%		

Wound infection was seen in 3 (15%) patients in open group, while it was present in 1 (5%) in laparoscopy group.

Post operative Seroma was seen in 10(50%) patients in open group, while it was present in 1 (5%) in laparoscopy group. P value was 0.003 and it is statistically significant.

Haematoma was seen in 4(20%) patients in open group, while it was not seen in laparoscopy group.

P value is 0.106 which is not significant.

Skin necrosis was seen in 4(20%) patients in open group, while it was not seen in laparoscopy group.

p Value is 0.106 which is not significant.

The duration of hospital stay was for a median period of 3.75(+/-1.16). days in laparoscopic group and 8.75(+/-2.47)days in open group. The difference was statistically significant, p<0.001. It was more in open group due to increased pain, wound infection, injectable antibiotics used and less mobilization due to pain.

All patients who underwent laparoscopic repair were able to return to normal work on average of 16.35 days compared to 25.25 days in open group. The difference was statistically significant(p<0.001)

Cosmetically laparoscopic repair is better than open repair. Here p value is <0.001 and it is statistically significant.

**DISCUSSION**

In the present study, the mean age is comparable between the two groups: 53 yrs in open group and 48.5yrs in laparoscopy group. In the study conducted by Misra et al in 2006 the mean age of the patients in open group is 45.2 yrs and laparoscopy group is 45.96 yrs. In the study conducted by Itani et al the mean age in laparoscopy group was 61.2 yrs and in open group was 59.6 yrs.

In the present study of ventral hernia consisting of epigastric, umbilical, para umbilical and incisional hernias, majority of the patients in open group and had incisional hernia (55%) in laparoscopy group also majority were incisional hernia (40%).

In the present study most of the patients were females in both open (80%) and laparoscopy groups (80%). In the study conducted by Itani et al majority were men in both open (91.8%) and laparoscopy (91.8%)

groups2. In the study conducted by Misra et al about 80% were females in both the groups1.

The operating time is one of the detrimental factors in the assessment of the effectiveness of the procedure. In the study comparison with respect to duration of surgery, laparoscopic procedure has taken a mean of 93.25( $\pm$ 14.44) minutes as compared to open mesh repair which has taken 88.75( $\pm$ 12.34) minutes similar observations have also been reported by other studies.

STUDY	DURATION OF SURGERY(min)	
	Laparoscopic Repair	Open Repair
Holzman et al <sup>3</sup>	128	98
Carbajo et al <sup>4</sup>	87	112
Park et al <sup>5</sup>	95	75
Chari et al <sup>6</sup>	124	78
This study	93.25	88.75

In the almost all literature the operating time of laparoscopic repair was found to be more than that of open repair, in considering the operating time, the exact identification of the start of the procedure and its conclusion vary. In general the time should be calculated from the insertion of first trocar to the end of skin suturing.

In the present study the pain score was 3.70( $\pm$ 0.47) for open group as compared to 1.75( $\pm$ 0.44) in laparoscopic group because of longer incision, stretch of muscles and wound infection, thus the post operative analgesics required was more in open group as compared to laparoscopic group.

In the present study there is significant reduction in incidence of post operative wound infection/ trocar site cellulitis in laparoscopic group (5%) as compared to open group (30%).

A similar study done by others has also shown a significant reduction in wound infection rate.

STUDY	INFECTION RATE(wound infection or trocar site cellulites)	
	Laparoscopic Repair(%)	Open Repair(%)
Holzman et al <sup>3</sup>	5	6
Carbajo et al <sup>4</sup>	0	18
Park et al <sup>5</sup>	0	2
Ramshaw et al <sup>7</sup>	0	3
Present study	5	30

One of the main advantages of laparoscopic repair is the decreased wound related complications. Almost all the RCTs except Ascencio et al<sup>8</sup> 2009 reported decreased wound related complications with laparoscopic repair. Amongst all, the most common complications are seroma formation and wound infection. Seroma rates are higher in laparoscopy group in the studies conducted by Ascencio et al<sup>8</sup>, Misra et al<sup>1</sup> and Pring et al<sup>9</sup>, while Itani et al<sup>2</sup> 2010 reported lower seroma rates in laparoscopy group. Wound infection rates are higher in open group in all the studies.

Wound infection is lower in laparoscopic hernia repair compared to open, as there is decreased extent of tissue dissection in the former. Trocar site cellulitis seen in laparoscopic repair resolves with antibiotics. The seroma rate is 50% in open group when compared to 5% in laparoscopy group (P = 0.003). The above values are statistically significant. Mesh infection is not observed in any of the cases in our study. Hence removal of the mesh was not warranted.

Duration of hospital stay was significantly low for laparoscopic group is low with a mean of 3.75( $\pm$ 1.16) days as compared to open group 8.75( $\pm$ 2.47) days. The P value is <0.001, which is statistically significant. The longer the hospital stay in open group as compared group is also been reported by others as follows.

STUDY	MEAN HOSPITAL STAY in days	
	Laparoscopic Repair	Open Repair
Holzman et al <sup>3</sup>	1.6	5
Carbajo et al <sup>4</sup>	2.2	9.1
Park et al <sup>5</sup>	3.4	6.5
Ramshaw et al <sup>7</sup>	1.7	2.8
Present study	3.75	8.7

The return to normal activity was early for laparoscopic group 16.35( $\pm$ 2.78)days as compared to open group 25.25( $\pm$ 3.21) which is compared to standard literature.

## CONCLUSION AND RECOMMENDATIONS:

We conclude that laparoscopic surgery is minimally invasive technique for treatment of ventral hernia as compared to open repair. It is associated with much less pain in the post operative period. It also provides a more satisfactory alternative to open surgery because of better cosmesis, reduced hospitalisation and earlier return of patient to daily activities, with no significant differences in short term follow up.

In perspective of the above conclusions the recommendations of this study are:

Laparoscopic hernia repair should be considered as the procedure of choice when dealing with ventral hernia. The economic burden of laparoscopic procedure and mesh should be lessened so as to make the procedure universally acceptable. A proper long term follow up of a patient undergoing laparoscopic procedure has to be ensured.

## References

- Misra MC, Bansal VK, Kulkarni MP, Pawar DK. Comparison of laparoscopic and open repair of incisional and primary ventral hernia: results of a prospective randomized study. *Surg Endosc*. 2006 Dec;20(12):1839-45
- Itani KM, Hur K, Kim LT, Antony T, Berger DH, Reda D et al. Comparison of Laparoscopic and Open Repair With Mesh For Treatment of Ventral Incisional Hernia. *Arch Surg* 2010;145(4):4:322-328.
- Holzman, Purut CM. laparoscopic ventral and incisional hernioplasty. *Surg endosc* 1997; 11:32-35.
- Carbajo MA, Martin del Olmo JC, Blanco JI, de la Cuesta C, Toledano M, Martin F. Laparoscopic treatment vs. open surgery in the solution of major incisional and abdominal wall hernias with mesh. *Surg Endosc*. 1999; 13:250-2.
- Park A, Birch DW, Lovrics P. Laparoscopic and open incisional hernia repair: a comparison study. *Surgery*. 1998;124(4):10:816-21; discussion 821-2.
- Chari R, Chari V, Eisenstat M, Chung R. A case controlled study of laparoscopic incisional hernia repair. *Surg Endosc*. 2000; 14:117-9.
- Ramshaw BJ, Esartia P, Schwab J, Mason EM, Wilson RA, Duncan TD, Miller J, et al. Comparison of laparoscopic and open ventral herniorrhaphy. *Am Surg*. 1999;65(9):827-831; discussion 831-822.
- Ascencio F, Aguilio J, Peiro S et al.: Open randomized clinical trial of laparoscopic versus open incisional hernia repair. *Surg Endosc* 2008; 31:2267-71
- Pring CM, Tran V, O'Rourke N, Martin JJ. Laparoscopic versus open ventral hernia repair: A randomized controlled trial. *ANZ J Surg* 2008;78:903-6.