

## Laparoscopic versus open ventral hernia repair - A comparison of short term postoperative complications

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**Conflicts of Interest:** Nil

### Abstract

**Background:** The method of laparoscopic ventral hernia repair (LVHR) is becoming more and more popular, replacing the traditional open ventral hernia repair (OVHR). LVHR reduces morbidity and length of hospital stay compared with open ventral hernia repair. Although laparoscopic repair for ventral hernia has become increasingly popular, its outcome need further evaluation.

**Objective:** This study is a comparison of laparoscopic approach with open ventral hernia repair (OVHR) in terms short term post-operative complications, wound

infection, seroma/collection, respiratory tract infections and abdominal wall cellulitis.

**Methods:** Prospective clinical study of ventral hernia repair performed in a medical college in Kerala over a period of 18 months (January 2019 to July 2021). Sample size was calculated as 80 (40 in laparoscopic group and 40 in open hernia repair group).

Adult patients between the age group of 18 to 60 years with ventral hernia of <10 cm were included in this study.

**Results:** A total of 80 patients underwent ventral hernia repair, 17.5% (7) of the patients undergone open repair were suffering from post-operative infection compared

to 10% (4) patients undergone laparoscopic repair of ventral hernia. 10% (4) of the patients undergone open repair were suffering from seroma compared to 5% (2) patients undergone laparoscopic repair of ventral hernia.

**Conclusions:** LVHR is routinely performed in most centres and is a safe and feasible alternative to open ventral hernia repair. Our study showed that LVHR has advantage over open repair with respect to post-operative pain, seroma formation and post-operative infection.

**Keywords:** Ventral hernia, Ventral hernia repair, laparoscopic, open ventral hernia, LVHR.

### **Introduction**

Ventral hernias are a common surgical pathology and ventral incisional hernias complicate 10- 20% of laparotomies. (1)

The method of laparoscopic ventral hernia repair (LVHR) is becoming more and more popular, replacing the traditional open repair. LVHR reduces morbidity and length of hospital stay compared with open ventral hernia repair. Literature suggests that laparoscopic surgery reduces intraoperative blood loss, shortens hospital stay, and improves pain scores. (2)

Despite evidence of the benefits of laparoscopy, its utilization in ventral hernia repair has lagged behind that of other complex surgical procedures. (3) Nevertheless, laparoscopy may be complicated in patients with large hernias or adhesions from previous abdominal surgeries. There is some evidence that primary fascial closure (PFL) results in reduced seroma formation. (4) Even so, both techniques are now widely used and considered safe. (5)

The choice of surgical approach is usually based on defect size, patient factors, and surgeon preference. International guidelines recommend open repair for

primary small defects (>10 cm) requiring extensive tissue dissection. (6) All other hernias are suitable for laparoscopic repair. According to these guidelines, open and laparoscopic hernia repair are mutually exclusive in most cases.

There is little literature on the risk profile of laparoscopic abdominal hernia repair, which is why further research is needed. Due to the high complexity of incisional hernias and the considerable variability in surgical management, we had to adapt our approach to the individual patient.

Although laparoscopic repair for ventral hernia has become increasingly popular, its outcome need further evaluation. This study is a comparison of laparoscopic approach with open ventral hernia repair (OVHR) in terms short term post-operative complications, wound infection, seroma/collection, respiratory tract infections and abdominal wall cellulitis.

### **Materials and methods**

Prospective clinical study of ventral hernia repair performed in a medical college in Kerala over a period of 18 months (January 2019 to July 2021). Sample size was calculated as 80 (40 in laparoscopic group and 40 in open hernia repair group).

Adult patients between the age group of 18 to 60 years with ventral hernia of <10 CM were included in this study.

After getting clearance from Institutional ethical committee, all patients attending the outpatient or casualty of Surgery department who were having ventral hernia and consented to participate in this study were included in the study. After admission, mostly patients were undergone surgery within 2-5 days.

Patients were allocated by consecutive sampling till sample size was obtained. Patients were operated under

spinal block or general anaesthesia. Patients underwent polypropylene mesh repair either inlay repair or onlay repair in open method and dual layer mesh in laparoscopic method.

Both the groups will be compared for post operative complications. Data was entered in Microsoft Excel and data was analysed using SPSS Statistics Version 28.

**Results**

A total of 80 patients underwent ventral hernia repair, out of this 40 underwent open ventral hernia repair and another 40 undergone laparoscopic ventral hernia repair. Sixty patients (75%) were female.

**Age distribution of study population**

Among the study subjects 67.5% of the subjects were belong to the age group of 51-60 years, and none of the patients were less that 31 years (Figure 1)

Table 1: Distribution of type of hernia.

Type of Hernia.	Type of repair				Total	
	Open		Laparoscopic			
	N	%	N	%	N	%
Paraumbilical Hernia	17	42.5	24	60	41	51.2
Umbilical Hernia	14	35	4	10	18	22.5
Epigastric Hernia	2	5	2	5	4	5
Incisional Hernia	7	17.5	10	25	17	21.3
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>80</b>	<b>100</b>

**Post-operative surgical site infection**

17.5% (7) of the patients undergone open repair were suffering from post-operative infection compared to 10% (4) patients undergone laparoscopic repair of ventral

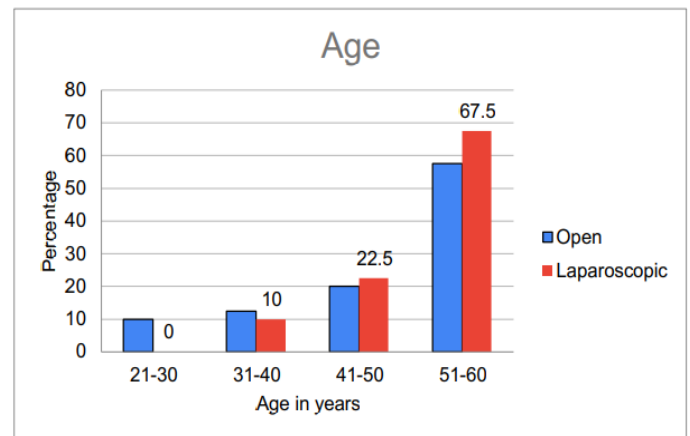


Figure 1: Age distribution of study participants

**Distribution of type of hernia**

Majority of the ventral hernia, 51.2% (41) in the study subjects were paraumbilical hernia, followed by umbilical hernia, 22.5% (18) and incisional hernia, 21.3% (17) (Table 1).

hernia (table 2). Fisher’s Exact test shows a p-value of 0.259, which means no statistically significant difference among open and laparoscopic group in terms of wound infection.

Table 2: Post-operative surgical site infection.

Surgical site infection	Study population				Total	
	Open		Laparoscopic			
	N	%	N	%	N	%
Absent	33	82.5	36	90	69	86.3
Present	7	17.5	4	10	11	13.8
Total	40	100	40	100	80	100

**Seroma/collection**

10% (4) of the patients undergone open repair were suffering from seroma compared to 5% (2) patients undergone laparoscopic repair of ventral hernia (Table

Table 3: Post operative seroma.

Seroma/Collection	Type of repair				Total	
	Open		Laparoscopic			
	N	%	N	%	N	%
Absent	36	90	38	95	74	92.5
Present	4	10	2	5	6	7.5
Total	40	100	40	100	80	100

**Persistent numbness**

Persistent numbness is almost equal in both open and laparoscopic patients underwent ventral hernial repair (Table 4). Fisher’s exact test shows a p-value of 0.692,

Table 4: Post-operative persistent numbness.

Persistent numbness.	Type of repair				Total	
	Open		Laparoscopic			
	N	%	N	%	N	%
Absent	38	95	38	95	76	95
Present	2	5	2	5	4	5
Total	40	100	40	100	80	100

3). Fisher’s exact test shows a p-value of 0.338, which means no statistically significant difference among open and laparoscopic group in terms of seroma formation.

which means no statistically significant difference among open and laparoscopic group in terms of persistent post-operative numbness.

**Persistent pain**

Persistent pain is also almost equal in both open and laparoscopic repair of ventral hernia, which was found to be 2.5% in both groups (Table 5). Fisher’s exact test

Table 5: Post-operative persistent pain.

Persistent pain	Type of repair				Total	
	Open		Laparoscopic			
	N	%	N	%	N	%
Absent	39	97.5	39	97.5	78	97.5
Present	1	2.5	1	2.5	2	2.5
Total	40	100	40	100	80	100

**Discussion**

With the advancement of technology and equipment, the method of laparoscopic repair of abdominal hernia is becoming more and more popular. However, laparoscopy can be complicated in patients with large defects or adhesions from previous abdominal surgery. (6) A 2015 meta-analysis of randomized controlled trials comparing open versus laparoscopic techniques published in the *International Journal of Surgery* showed no statistically significant difference in hernia recurrence rates. Nonetheless, the rate of wound infection was significantly lower in the laparoscopic group. (7)

Bernardi et al. Recently published in *Annals of Surgery*, it was concluded that defect closure in laparoscopic ventral hernia repair resulted in a statistically significant improvement in patients' quality of life (QoL); including pain, aesthetics, function and overall satisfaction. (8) This study also showed a difference in postoperative wound infection between LVHR and open OVHR. There is little evidence that laparoscopic repairs cause less pain than open repairs, or that 10 mm ports cause more pain than 5 mm ports. (9) Recent studies have shown that closing the hernia defect reduces the incidence of

shows a p-value of 0.753, which means no statistically significant difference among open and laparoscopic group in terms of persistent postoperative pain.

seroma. (10) Our seroma rate is 10% in open repair and 5% in laparoscopic.

Our infection rates were 17.5% in open surgery patients and 10% in LVHR patients. This is comparable to reported infection rates for laparoscopic repairs in the literature, which range from 1.8% to 12%. (3) However, open repair inherently requires more extensive tissue dissection and manipulation, producing a higher rate of wound infection. We believe that for selected patients, the combination of these two techniques can achieve the above-mentioned advantages of laparoscopic surgery benefits while reducing the risk of possible seroma and infection following extensive soft tissue dissection and its sequelae, which are required for a purely open technique.

**Conclusion**

Laparoscopic surgery for ventral hernia has become the first choice. Performed routinely in most Centers, LVHR is a safe and feasible alternative to open ventral hernia repair.

Our study demonstrated that LVHR is superior to open repair in terms of postoperative pain, seroma formation, and postoperative infection.

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