

## A Comparative and Prospective Study of Ventral Hernia Repair by Laparoscopic and Open Technique

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### Abstract:

**Background:** Ventral hernias, characterized by abdominal wall weakness, often require surgical intervention. Two common approaches, open and laparoscopic repair, offer unique benefits and challenges. This study aims to comprehensively assess the comparative outcomes of these techniques.

**Methodology:** A prospective analysis of 50 cases (25 open, 25 laparoscopic) was conducted, examining patient characteristics, operative times, postoperative pain, hospital stays, complications, and costs. The study maintained strict ethical guidelines.

**Results:** Laparoscopic ventral hernia repair demonstrated superiority in terms of reduced postoperative pain, shorter hospital stays, and lower complication rates compared to open surgery. However, laparoscopy required more extended operating times and incurred higher costs.

**Recommendations:** The study supports the preference for laparoscopic repair, emphasizing the need for careful patient selection. Large defects and specific patient profiles may still favor open surgery. Further research, including randomized controlled trials, should substantiate these findings.

**Conclusion:** Laparoscopic ventral hernia repair represents a promising option, particularly for its favorable patient outcomes. While considerations like cost and procedural duration merit attention, laparoscopy's benefits in terms of pain management and shorter hospitalization are noteworthy.

**Keywords:** Ventral hernia, laparoscopic repair, open surgery, complications, randomized controlled trials.

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### Introduction

An abdominal wall weakness is called a ventral hernia. There are various kinds of ventral hernias, and some develop following prior surgical procedures. Ventral hernias are frequently repaired surgically, with a large percentage of these procedures being performed laparoscopically. This is especially true for tiny umbilical and epigastric hernias. Hernias tend to enlarge over time, therefore it's critical to heal them as soon as possible. Incisional hernias have increased as a result of more abdominal procedures, and surgeons are aware that some incisions carry a higher risk of developing these hernias. Decisions about the type of incision, the materials for sutures, and methods for closing wounds have resulted from this. Patients may have complications and hazards from ventral hernias. As treatment modalities have developed over time, mesh repair has outperformed traditional sutures in terms of effectiveness. The benefits of laparoscopic ventral hernia repair, which include reduced pain, shortened hospital stays, and quicker

recovery, have made the procedure more and more common [1,2].

The recurrence rate dropped dramatically from 63% to 32% when open mesh repair was utilized in place of open suture repair. When mesh was applied for the first time, even for minor hernia defects, the recurrence rate drastically decreased, falling from 67% to 17% [3]. Tension-free mesh repair procedures become the standard approach. Compared to open surgery, laparoscopic repair of ventral hernias has gained a lot of popularity among surgeons and patients since the first instance in 1993 [4]. It has benefits like fewer pain after surgery, shorter hospital stays, and aesthetic appeal. Although it necessitates lengthier incisions and flap raising—both of which are unnecessary with laparoscopic procedures—using a prosthesis in place of typical anatomical repair has been shown to be helpful [4].

Numerous research comparing laparoscopic and open repairs are now being conducted; some indicate that the recurrence rates may be similar, at about 9%. When there is gangrene, blockage, strangulation, irreducibility, or severe skin alterations and ulceration, a ventral hernia is deemed difficult [5].

The purpose of the article is to compare the safety and efficacy of open and laparoscopic ventral hernia repairs. It also addresses a number of contentious issues that are relevant to both procedures, such as mesh selection, recurrence rates, post-operative pain, recovery time, hospital stay, cost-effectiveness, and surgical technique and patient selection.

### Methodology

**Study Design:** A prospective study was conducted.

**Study Setting:** This study was conducted by comparing open versus laparoscopic ventral hernia repairs in NMCH in September 2020- June 2023.

**Participants:** Participants were compared contrasting laparoscopic and open ventral hernia were reviewed.

**Inclusion and Exclusion Criteria:** The inclusion criteria included Swiss cheese-style hernias, recurring incisional hernias, hernias measuring three centimetres or less, and hernias associated with obesity. Multiple abdominal scars, significant

abnormalities, candidates for abdominoplasty, infections, blockages, heart problems, and portal hypertension were among the exclusion criteria.

**Study Size:** After fulfilling the inclusion criteria, a total of 50 cases were studied of which 25 were open and 25 were laparoscopic repairs.

**Data Collection and Analysis:** The study collected pain data using the Visual Analog Scale (VAS) and employed SPSS for analysis. Mean and standard deviation were used to express results.

**Bias:** To minimize bias, the goal of the research was not disclosed to the participants or healthcare providers during data collection. Additionally, data analysts were blinded to the identity of the participants.

**Statistical Analysis:** SPSS for Windows was used to analyse the data. It was calculated to find the mean and standard deviation. The Pearson Chi-square test was used to examine differences between treatment groups, and ANOVA was used to evaluate variance. A probability value was deemed significant if it was less than 0.05.

**Ethical Considerations:** The study was carried out in accordance with ethical guidelines, which included getting each participant's informed consent. The ethics committee examined and approved the study protocol.

### Results

**Table 1: Comparative Data between Open and Laparoscopic Ventral Hernia Repair Procedures**

Parameter	Open Surgery	Laparoscopic Surgery
Total Cases Studied	25	25
Age Range	27 - 75 years	27 - 75 years
Male Patients	7 (28%)	7 (28%)
Female Patients	18 (72%)	18 (72%)
Male-to-Female Ratio	1:4.7	1:4.7
Hernia Types (Majority)	Para-umbilical and Incisional	Para-umbilical and Incisional
Mean Operative Time (minutes)	111	170
Mean Pain Score (0-10)	3.80	2.35
Mean Hospital Stay (days)	6.45	4.10
Complications (%)	~50%	~20%
- Wound Infection	31	5
- Seroma/Collection	5	1
- Flap Necrosis	3	0
- Respiratory Infection	2	0
- Abdominal Wall Cellulitis	1	0
- Mesh Rejection	0	0
Return to Daily Activities (days)	22	10

There were 25 open and 25 laparoscopic repairs out of the 50 cases that were examined. A majority of the patients (50%) were in their fourth or sixth decade, with ages ranging from 27 to 75. The male-to-female ratio among the patients was 4.7:1, with 33 of them being female and 7 being male. Hernias emerging from previous lower midline scars were usually para-umbilical or incisional in nature. With a mean operating time of 170 minutes as opposed to 111 minutes for open surgeries, laparoscopic procedures required more time. With open surgery, the mean pain scores were 3.80 and 2.35, respectively, on a visual analogue scale ranging from 0 (no pain) to 10 (highest pain). With a p-value of 0.0005, these variations were deemed statistically significant.

In comparison to open patients, which had a mean hospital stay of 6.45 days, laparoscopic cases had a lower length (6.10 days). The p-value for this difference was 0.0005, indicating statistical significance. 20 percent of laparoscopic procedures and almost half of open procedures had complications. The following were notable complications: 3 flap necrosis, 2 respiratory infections, 1 abdominal wall cellulitis, 31 wound infections (five from open procedures, 5 from laparoscopic procedures), 5 seroma/collection (5 from open procedures, 1 from laparoscopic procedures), and no mesh rejection in either group. Patients who had laparoscopic surgery recovered from their procedures in 10 days on average, but patients who had open surgery required 22 days, with a statistically significant p-value of 0.0005.

### Discussion

A study compared 50 ventral hernia repair cases, with 25 open and 25 laparoscopic procedures. Patients, mostly in their 4th to 6th decades, had a 4.7:1 male-to-female ratio. Laparoscopy required more time (170 vs. 111 minutes) but resulted in less pain (2.35 vs. 3.80). Hospital stays were shorter for laparoscopy (6.10 vs. 6.45 days), with fewer complications (20% vs. 50%). Laparoscopic patients recovered in 10 days compared to 22 days for open surgery.

An extensive analysis was carried out in this study to evaluate the results of ventral hernia repair surgeries performed laparoscopically versus openly. The investigators scrutinized various crucial facets to furnish a thorough comprehension of the comparative advantages of every methodology. The difference in operating times between laparoscopic and open repairs was one of the study's main conclusions. Due to the intricacy of the hernias being repaired, laparoscopic procedures took longer. This longer length was statistically significant, indicating that this

should be taken into account when determining the surgical strategy [6].

Comfort of the patient and pain management were also carefully evaluated. By measuring postoperative pain with the Visual Analogue Scale, the study found that patients who had laparoscopic repairs felt far less pain than those who had open repairs. The patient's entire experience and recuperation may be significantly impacted by this decrease in postoperative discomfort [7].

The variation in the length of hospital stays between the two groups was another interesting finding. Individuals who had laparoscopic repairs were released from the hospital sooner, which suggests a speedier recuperation. This is a crucial factor to take into account because shorter hospital stays are advantageous for patients and also help keep healthcare costs down [8].

The investigation also covered the possibility of problems. It was consistently shown in multiple trials that the open repair group experienced more frequent problems. This shows a decreased risk of surgical complications after laparoscopic ventral hernia repair. The advantages of laparoscopy as a surgical method for ventral hernia repair are reinforced by its safety profile, which is evidenced by the lower occurrence of complications [9].

Overall, this study offered insightful information about the differences between the results of open and laparoscopic ventral hernia repair techniques. It underlined how crucial it is to take into account variables including operating time, discomfort following surgery, length of hospital stay, and complication rates when making surgical decisions. The results encouraged the use of laparoscopic repair, especially when minimizing discomfort, accelerating recuperation, and lowering risks are critical. But it's crucial to customize the surgical technique selection to the unique traits and requirements of every patient.

### Conclusion

Laparoscopic ventral hernia repair offers advantages like less pain, shorter hospital stays, and lower short-term complications compared to open surgery. It enables visualization of hidden hernia defects and can treat multiple hernias through a single incision. However, open surgery may be preferred for large defects or lax abdominal walls, allowing for better rectus repair and additional procedures like abdominoplasty. Laparoscopy requires general anesthesia, leading to higher costs due to mesh and longer operating times. Patient satisfaction is higher with laparoscopy, but further research is needed to

confirm its role through randomized controlled studies.

**Limitations:** The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

**Recommendation:** The study supports the preference for laparoscopic repair, emphasizing the need for careful patient selection. Large defects and specific patient profiles may still favor open surgery. Further research, including randomized controlled trials, should substantiate these findings.

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#### List of abbreviations:

1. VAS - Visual Analog Scale
2. SPSS - Statistical Package for the Social Sciences
3. ANOVA - Analysis of Variance

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