

## EVALUATION OF POST-OPERATIVE PAIN AFTER VENTRAL HERNIA REPAIR

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**Abstract:** *The prospective study was conducted in Nishtar Medical Hospital from January 2022 to January 2023 to assess short-term post-operative pain following laparoscopic and open ventral hernia repair. A total of 50 patients fulfilled the inclusion criteria and were included in the study. Surgical options were explained to all participants, and the open or laparoscopic technique was performed based on the patient's choice. Post-operative data were recorded, including pain, wound and systemic complications, post-operative hospital stay, and need for ICU care and drain removal day. A visual analog scale (VAS) was used for measuring post-operative pain scores. Patients were followed up for 1 month. Results showed that the post-operative pain score calculated after the open repair was  $5.48 \pm 2.25$ , and after laparoscopic ventral hernia repair was  $6.05 \pm 1.98$ . Though the laparoscopic technique was associated with higher scores, this difference was statistically insignificant ( $P= 0.292$ ). Follow up of patients after one month showed laparoscopic repair was associated with lower complications, including pain, infection, seroma, and hematoma, compared to open repair. It can be concluded that laparoscopic hernia repair leads to lesser complications than the open technique. Using sutures and trackers in laparoscopic technique can result in relatively higher post-operative pain in the short term, but this difference is insignificant, due to which laparoscopic ventral hernia repair is more feasible.*

**Keywords:** Ventral Hernia Repair, Laparoscopic Repair, Mesh Repair, VAS Score

### Introduction

Ventral hernia in the abdomen is abdominal viscera protruding through a non-inguinal, non-hiatal defect in the abdominal fascia. They are common, and patients present with bulges or swelling over the abdomen, sometimes accompanied by a dull aching pain (Aleem et al., 2022). Ventral hernias can be incisional, lumbar, spigelian, epigastric and umbilical hernia. The European Hernia Society has classified ventral hernias as incisional and primary ventral hernias. An incisional hernia is present on the incision of the operated skin, while a primary ventral hernia is on normal skin (Sneiders et al., 2019). Its pathogenesis includes repetitive stresses causing microscopic tissue tears. Various factors, including chronic cough, constipation, urinary straining, obesity, and pregnancy, are responsible for it (Lodha et al., 2022).

Ventral hernias can be repaired through a laparoscopic or open approach. Recently, the hybrid approach is becoming popular for incisional hernias (Sharma et al., 2021).

A previous study has shown that the laparoscopic approach leads to improved quality of life, less post-operative pain, and long-term wound infection (Basheer et al., 2018). Various studies have evaluated long-term impacts on the quality of life after repairing incisional, umbilical, and other ventral hernias (Nadim et al., 2021; Pereira and Rai, 2021; Rognoni et al., 2020). However, there is limited literature on short-term post-operative pain after ventral hernia repair. Thus, we will assess short-term post-operative pain following laparoscopic and open ventral hernia repair in this study. We will also evaluate complications associated with both techniques.

### Methodology

The prospective study was conducted in Nishtar Medical Hospital from January 2022 to January 2023. The study included patients aged > 18 who had ventral hernias and underwent laparoscopic or open hernia repair. Those with lumbar hernias and acute intestinal obstruction were excluded. A total of 50 patients fulfilled the inclusion criteria and were included in the

study. Informed consent of the participants was taken. The ethical board of the hospital approved the study. All participants underwent clinical examination. Details of the patients, including demographic data, risk factors, previous surgical history, laboratory investigations, comorbidities, type, size, and hernia content, were recorded. Surgical options were explained to all participants, and the open or laparoscopic technique was performed based on the patient's choice. Intraoperative data were recorded, including a procedure performed, complications, drain placement, and the need for conversion. Post-operative data were recorded, including pain, wound and systemic complications, post-operative hospital stay, and need for ICU care and drain removal day. A visual analog scale (VAS) was used for measuring post-operative pain scores. Based on patients' responses, pain was quantified on a scale of 1-10 (10 being severe pain). VAS score was calculated three times, after every 12 hours, and an average score was calculated. Doses of analgesics required postoperatively were also recorded. Patients were followed up for 1 month, and post-operative complications were assessed after surgery. Complications, including pain, infection, hematoma, seroma, need for re-laparoscopy, and post-operative ileus, were recorded.

Data were analyzed using SPSS version 23.0. Nominal data were represented as frequency and percentage, and continuous data as mean and standard deviation. Chi-square test or Fischer's exact test for comparison of nominal data. An unpaired t-test was used for the comparison of continuous data. P value <0.05 was considered statistically significant.

## Results

Of 50 patients, 29 underwent open technique, and 21 underwent laparoscopic repair. The mean age of the participants was  $50.1 \pm 11$  years. 25 were female, and 25 were male. 43 patients had no risk factors for hernia, while 4 had constipation, 2 had a chronic cough, and 1 had difficulty micturition. Of 50 patients, 8 had large hernias, and 42 had small hernias. 40 patients did not require any abdominal drain, while 10 required it. Of 50 patients, 15 had epigastric hernias, 15 had umbilical hernias, and 20 had incisional hernias. Of 21 patients who underwent laparoscopic repair, 5 were switched to open repairs mainly due to dense adhesions and irreducible content.

Average hospital stay and return to normal activity were assessed. Post-operative hospital stay in patients who underwent open repair was  $4.13 \pm 6.34$  days, and in patients who underwent laparoscopic repair was  $2.55 \pm 1.32$  days. This difference was statistically insignificant ( $P=0.18$ ). The average days of return to activity after the open repair were ( $3.08 \pm 1.87$  days, and after the laparoscopic repair was  $3.07 \pm 1.67$ . This was statistically insignificant ( $P=0.96$ ).

The post-operative pain score calculated after the open repair was  $5.48 \pm 2.25$ , and after laparoscopic ventral hernia repair was  $6.05 \pm 1.98$ . Though the laparoscopic technique was associated with higher scores, this difference was statistically insignificant ( $P= 0.292$ ) (Table I). Follow-up of patients after one month showed laparoscopic repair was associated with lower complications, including pain, infection, seroma, and hematoma, compared to open repair (Table II).

**Table I Comparison of VAS score and analgesic requirement between laparoscopic and open ventral hernia repair**

Variable	Laparoscopic repair	Open repair	P value
Pain score	$6.05 \pm 1.98$	$5.48 \pm 2.25$	0.292
Required analgesic dose	$6.04 \pm 3.05$	$2.13 \pm 2.98$	0.216

**Table II Comparison of post-operative complications after 1 month of surgery**

Complication	Laparoscopic repair	Open repair	P value
Yes	4	15	0.001
No	17	14	

## Discussion

Any abdominal surgery can majorly impact mental, social and physical well-being and disrupt the quality of life. Post-operative pain is the major factor that hampers normal life activities. This study assessed post-operative pain and complications associated with ventral hernia repairs by comparing open and laparoscopic repair outcomes. In the current study, epigastric, incisional, umbilical, and para-umbilical

hernias were common and were almost equally distributed in the study population. These results were consistent with the findings of a previous study conducted by Schlosser et al. Two third of the study population had a primary ventral hernia, while one-third had an incisional hernia (Schlosser et al., 2022). In our study, 29 underwent open technique, and 21 underwent laparoscopic repair. Of 21 patients who underwent laparoscopic repair, 5 were switched to open repairs mainly due to dense adhesions and

irreducible content. A study by Gupta et al. reported a 3.5% conversion rate primarily due to enterotomies, unlike our study, which had no incidence of enterotomy. It can be attributed to the small sample size in the current study. Moreover, the conversion rate in our study was 23.8%, much higher than the above study (Gupta et al., 2022).

The average hospital stay in both techniques was not significantly different. It's because most patients with medium-sized hernias who underwent open repair had pain due to long incisions. On the other, in laparoscopic technique use of trans-facial sutures and trackers led to moderate to severe post-operative pain, thus resulting in almost similar hospital stays in both. A previous study by Garmpis et al. also reported that the length of post-operative hospital stays with both techniques was not significantly different (Garmpis et al., 2019). While another study conducted by Shankaran et al. reported that using intraoperative tackers leads to increased post-operative stay (Shankaran et al., 2021). In the current study, though the difference between post-operative stay was insignificant, the open technique was associated with greater post-operative hospital stay due to associated complications. Another study by Ayyala et al. reported that post-operative complications lead to increased post-operative hospital stays (Ayyala et al., 2020).

Post-operative pain has a significant impact on overall quality of life. In the current study, post-operative pain after laparoscopic and open techniques was not significantly different. However, in the laparoscopic technique, post-operative was none significantly higher. A previous study showed that using intraoperative trackers in laparoscopic techniques is associated with greater post-operative pain (Ashrafi et al., 2019). Moreover, the dose of analgesic required after a laparoscopic technique was not significantly higher. This was in line with the finding of a previous study (Buldanlı et al., 2023). The assessment of post-operative complications showed that open ventral hernia was associated with a significantly higher rate of complications than the laparoscopic technique, consistent with a previous study's finding (Krpata et al., 2021). The limitation of this study is the small sample size; a larger, more detailed study is required for further analysis.

## Conclusion

Laparoscopic hernia repair lead to lesser complication compared to the open technique. Using sutures and trackers in laparoscopic technique can result in relatively higher post-operative pain in the short term, but this difference is insignificant, due to which laparoscopic ventral hernia repair is more feasible.

## Conflict of interest

The authors declared absence of conflict of interest.

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