



Original Article

A Comparative Study Between Laparoscopic Tapp Plus and Open Patch Repair for Medium-Sized Ventral Hernia

¹Dr. Harikaran G, ²Dr. Sandeep Jain, ³Dr. Pragyey Nawlakhe, ⁴Dr. Manoj paraste, ⁵Dr. Devendra Chaudhary, ⁶Dr. Aravind Rai

¹Surgery Resident, Department of General surgery, Gandhi Medical College, Bhopal, Madhya Pradesh, India

²Assistant Professor, Department of General surgery, Gandhi Medical College, Bhopal, Madhya Pradesh, India

³Assistant Professor, Department of General surgery, Gandhi Medical College, Bhopal, Madhya Pradesh, India

⁴Assistant Professor, Department of General surgery, Gandhi Medical College, Bhopal, Madhya Pradesh, India

⁵Associate Professor, Department of General surgery, Gandhi Medical College, Bhopal, Madhya Pradesh, India

⁶Professor and HOD, Department of General surgery, Gandhi Medical College, Bhopal, Madhya Pradesh, India

OPEN ACCESS

Corresponding Author:

Dr sandeep jain

drsandeepjain10@gmail.com

Received: 22-02-2026

Accepted: 21-3-2026

Available online: 04-04-2026

Copyright © International Journal of
Medical and Pharmaceutical Research

ABSTRACT

Background: Ventral hernia repair has undergone significant evolution, shifting from conventional open techniques to minimally invasive approaches. Laparoscopic Transabdominal Preperitoneal (TAPP) Plus repair allows anatomical restoration with potentially lower morbidity; however, its comparative effectiveness with open patch repair in medium-sized ventral hernias remains to be fully established.

Objectives: To compare laparoscopic TAPP Plus repair and open patch repair in terms of postoperative pain, complications, duration of hospital stay, and recurrence.

Materials and Methods: This prospective observational study was conducted on 65 patients with medium-sized ventral hernias (<5 cm) at a tertiary care centre. Patients were managed either by laparoscopic TAPP Plus repair (n=22) or open mesh repair (n=43). Postoperative outcomes including pain (VAS score), complications, and hospital stay were evaluated. Statistical analysis was performed using SPSS version 25.

Results: Patients undergoing laparoscopic TAPP Plus repair experienced significantly lower postoperative pain at one week ($p < 0.001$) and shorter hospital stay (4.0 vs 5.23 days; $p < 0.001$). Although wound infection and seroma formation were less frequent in the laparoscopic group, the differences were not statistically significant. No recurrence was observed in either group during the 6-month follow-up.

Conclusion: Laparoscopic TAPP Plus repair is a safe and effective alternative to open repair for medium-sized ventral hernias, offering better early postoperative outcomes and faster recovery.

Keywords: Ventral hernia, TAPP Plus, laparoscopic repair, open hernioplasty, postoperative pain, preperitoneal mesh.

INTRODUCTION

Ventral hernia is defined as the protrusion of intra-abdominal contents through a defect in the anterior abdominal wall and represents a common surgical condition encountered in clinical practice. It includes umbilical, epigastric, paraumbilical, and incisional hernias, with contributing factors such as obesity, previous abdominal surgery, and increased intra-abdominal pressure [1,2]. Open mesh repair has traditionally been the standard approach for the management of ventral hernias. Although the use of prosthetic mesh has significantly reduced recurrence rates, open repair continues to be associated with postoperative pain, wound-related complications, and prolonged recovery [3]. Minimally invasive techniques have gained increasing acceptance due to advantages such as reduced postoperative pain, shorter hospital stay, and early return to normal activity. Laparoscopic approaches, particularly intraperitoneal onlay mesh (IPOM) repair, have demonstrated favorable outcomes; however, concerns remain regarding intraperitoneal mesh-related complications [4,5]. To overcome these limitations, extraperitoneal techniques such as the transabdominal preperitoneal (TAPP) approach have been developed.

This method allows mesh placement in the preperitoneal space and reduces contact with intra-abdominal viscera. The TAPP Plus modification further enhances outcomes by incorporating fascial defect closure [6].

Recent studies and meta-analyses have shown that laparoscopic approaches, including TAPP-based techniques, are associated with improved early postoperative outcomes while maintaining comparable long-term results [7]. Therefore, the present study was undertaken to compare laparoscopic TAPP Plus repair with open patch repair in patients with medium-sized ventral hernias, with emphasis on postoperative pain, complications, duration of hospital stay, and recurrence.

MATERIALS AND METHODS

This prospective analytical observational study was conducted in the Department of General Surgery at Gandhi Medical College and associated hospitals, Bhopal, over a period of 18 months. Patients diagnosed with ventral hernia and undergoing surgical treatment during the study period were included. A total of 65 patients were enrolled based on feasibility and available case load and were evaluated to compare laparoscopic and open surgical approaches.

Inclusion Criteria

- Age >18 years
- Ventral hernia with defect size <5 cm
- Patients willing to provide informed consent

Exclusion Criteria

- Hernial defect size >5 cm
- Recurrent hernia
- Obstructed or strangulated hernia

Study Procedure

All patients underwent detailed clinical assessment and relevant investigations. Based on clinical suitability, patients were treated either with laparoscopic TAPP Plus repair or open mesh repair (onlay/sublay). Standard perioperative protocols were followed. Postoperative follow-up included assessment of pain, complications, and recovery.

Outcome Measures

- Postoperative pain (VAS score)
- Wound infection
- Seroma formation
- Recurrence
- Duration of hospital stay

Statistical Analysis

Data were analyzed using SPSS version 25. Continuous variables were expressed as mean \pm standard deviation, and categorical variables as percentages. Appropriate statistical tests including Chi-square test, Fisher's exact test, and independent t-test were applied. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 65 patients were included in the study. Most patients were in the 51–60 years age group, with no statistically significant difference in age and gender distribution between the two groups ($p > 0.05$). A slight male predominance was observed. Conversion from laparoscopic to open repair was required in 3 cases due to dense adhesions and peritoneal breach, without any major intraoperative complications.

Table 1: Distribution of patients according to the intervention group

Group	No of Patients	Percentage
Laparoscopic Transabdominal Preperitoneal Plus Repair	22	33.8%
Open Hernioplasty	Onlay repair	13
	Sublay repair	30
		46.2%

In total, 65 patients were included, of whom 22 (33.8%) underwent laparoscopic TAPP Plus repair and 43 (66.2%) underwent open repair.

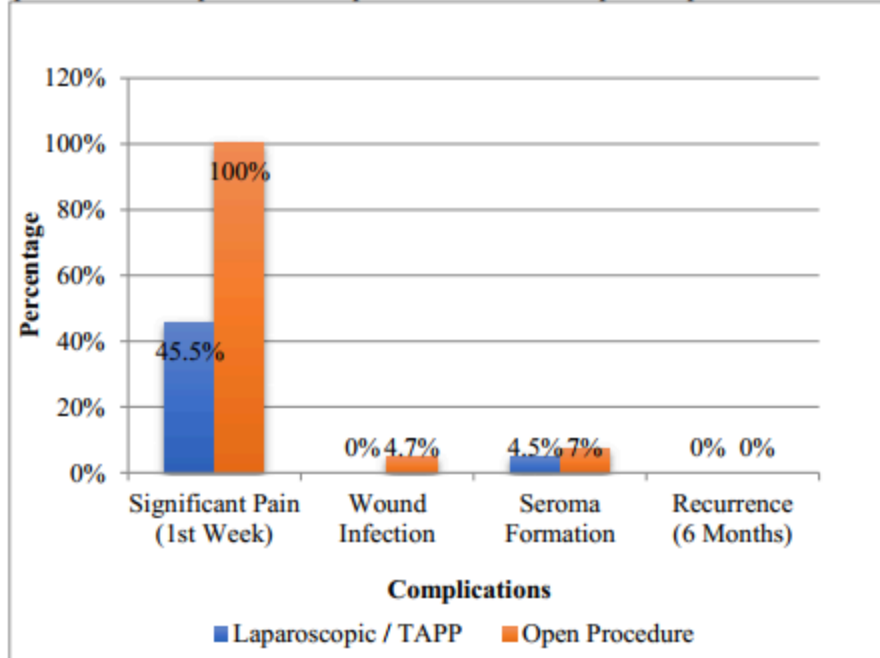
Table 2: Comparison of VAS Scores between Groups at follow up visits

Follow-up Period	Laparoscopic TAPP Plus Group Mean \pm SD	Open Repair Group Mean \pm SD	P-value
1st Week	2.73 \pm 2.27	5.60 \pm 1.14	<0.001

1st Month	0.95 ± 1.21	1.42 ± 1.18	0.149
3rd Month	0.86 ± 1.13	0.93 ± 1.20	0.826
6th Month	1.00 ± 1.07	1.16 ± 1.17	0.577

Postoperative pain was significantly lower in the laparoscopic group at 1 week ($p < 0.001$), with no significant difference at later follow-ups.

Figure 1: Comparison of Postoperative Complications between Laparoscopic TAPP Plus and Open Repair



Postoperative complications were comparable between groups, except for significantly higher early postoperative pain in the open repair group ($p < 0.001$).

Table 3: Comparison of mean length of hospital stay in days between two groups

Group	N	Mean length of stay in days	SD	P value
Group 1 (Laparoscopic TAPP Plus)	22	4.00	0.98	< 0.001
Group 2 (open hernia repair)	43	5.23	1.21	

Hospital stay was significantly shorter in the laparoscopic group ($p < 0.001$).

Table 4: Comparison of operative time between groups

Operative time	Laparoscopic TAPP Plus Group (N=22)	Open Repair Group (N=43)	p value
Operative Time (Range In Mins)	89-160	53-135	0.0018
Mean Average Time (Mins)	114 ± 19.72	95 ± 23.56	

Operative time was significantly longer in the laparoscopic group ($p = 0.0018$).

DISCUSSION

The management of ventral hernias has undergone considerable evolution with the growing adoption of minimally invasive techniques. In the present study, laparoscopic TAPP Plus repair was compared with open patch repair, and the findings indicate improved early postoperative outcomes with the laparoscopic approach.

A key finding of this study was significantly lower postoperative pain in the laparoscopic group during the early postoperative period. This may be attributed to reduced tissue handling, smaller incisions, and minimal disruption of the abdominal wall. Similar findings have been demonstrated in randomized controlled trials comparing laparoscopic and open ventral hernia repair [8]. Postoperative complications such as wound infection and seroma formation were observed to be lower in the laparoscopic group, although the difference was not statistically significant. Previous systematic reviews and meta-analyses have also reported reduced wound-related complications with minimally invasive approaches [9]. The duration of hospital stay was significantly shorter in the laparoscopic group, reflecting faster recovery and early mobilization. Comparative studies have consistently shown reduced hospitalization with laparoscopic repair when compared to open techniques [10]. Operative time was found to be longer in the laparoscopic TAPP Plus group, which can be explained by the technical complexity of the procedure and the associated learning curve. Similar observations have been reported in review articles evaluating laparoscopic ventral hernia repair [11]. No recurrence was observed in either group during the follow-up period, suggesting that both techniques are effective in the short term. Multicenter randomized trials have also demonstrated comparable recurrence rates between laparoscopic and open repair [12].

The findings of the present study suggest that laparoscopic TAPP Plus repair is a safe and effective alternative to open repair, offering better early postoperative outcomes with comparable long-term results.

CONCLUSION

Laparoscopic TAPP Plus repair is a safe and effective alternative to open repair for medium-sized ventral hernias. It offers advantages such as reduced early postoperative pain, shorter hospital stay, and lower wound-related complications. With appropriate expertise, it can be considered a preferred approach, although further long-term studies are required.

REFERENCES

1. Liang MK, Holihan JL, Itani K, Alawadi ZM, Gonzalez JR, Askenasy EP, et al. Ventral hernia management: expert consensus guided by systematic review. *Ann Surg.* 2017;265(1):80–89.
2. Henriksen NA, Montgomery A, Kaufmann R, Berrevoet F, East B, Fischer J, et al. Guidelines for treatment of umbilical and epigastric hernias from the European Hernia Society and Americas Hernia Society. *Br J Surg.* 2020;107(3):171–190.
3. Holihan JL, Nguyen DH, Nguyen MT, Mo J, Kao LS, Liang MK. Mesh location in open ventral hernia repair: a systematic review and network meta-analysis. *World J Surg.* 2016;40(1):89–99.
4. Bittner R, Bain K, Bansal VK, Berrevoet F, Bingener-Casey J, Chen D, et al. Update of guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society (IEHS))—Part A. *Surg Endosc.* 2019;33(10):3069–3139.
5. Pereira C, Rai R. Open versus laparoscopic ventral hernia repair: a randomized clinical trial. *Cureus.* 2021;13(12):e20490.
6. Chuah YHD, Lloyd A, Sahebally SM. IPOM versus eTEP as minimally invasive approaches for ventral/incisional hernias: a systematic review and meta-analysis. *Hernia.* 2025;29(1):144.
7. Helgstrand F. National results after ventral hernia repair. *Dan Med J.* 2016;63(7):B5258.
8. Itani KM, Hur K, Kim LT, Anthony T, Berger DH, Reda D, et al. Comparison of laparoscopic and open repair with mesh for the treatment of ventral incisional hernia: a randomized trial. *Arch Surg.* 2010;145(4):322–328.
9. Martins MR, Santos-Sousa H, do Vale MA, Bouça-Machado R, Barbosa E, Sousa-Pinto B. Comparison between the open and the laparoscopic approach in primary ventral hernia repair: a systematic review and meta-analysis. *Langenbecks Arch Surg.* 2024;409(1):52.
10. Shao JM, Deerenberg EB, Elhage SA, Colavita PD, Prasad T, Augenstein VA, et al. Are laparoscopic and open ventral hernia repairs truly comparable? A propensity-matched study in large ventral hernias. *Surg Endosc.* 2021;35(8):4653–4660.
11. Misiakos EP, Patapis P, Zavras N, Tzanetis P, Machairas A. Current trends in laparoscopic ventral hernia repair. *JSLs.* 2015;19(3):e2015.00048.
12. Rogmark P, Petersson U, Bringman S, Eklund A, Ezra E, Sevoni D, et al. Short-term outcomes for open and laparoscopic midline incisional hernia repair: a randomized multicenter controlled trial (ProLOVE trial). *Ann Surg.* 2013; 258(1):37–45.