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Original Research Article

Comparing Laparoscopic and Open Techniques for Ventral Hernia Repair: A Prospective Observational Study

Arvind Kumar Singh[1], Vishal Kumar[2], Rajendra Prasad Singh[3]

[1]Medical Officer, Department of General Surgery, Bhagwan Mahavir Institute of Medical Sciences Pawapuri, Nalanda, Bihar, India

[2]Attending Consultant, Department of GI and Bariatric Surgery, Jay Prabha Medanta Super Speciality Hospital, Patna, Bihar, India

[3]Professor and HOD, Department of General Surgery, Bhagwan Mahavir Institute of Medical Sciences Pawapuri, Nalanda, Bihar, India

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Corresponding Author: Arvind Kumar Singh

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Abstract:

Background: Ventral hernias represent a common surgical condition encountered in general surgery, often resulting in pain, cosmetic concerns, and functional impairment. With advances in minimally invasive surgery, laparoscopic ventral hernia repair has emerged as an alternative to open repair, yet debate persists regarding the optimal approach.

Objective: To compare clinical outcomes of laparoscopic and open ventral hernia repair in terms of operative parameters, postoperative complications, and early recurrence.

Methods: This prospective comparative study was conducted at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, over 12 months. One hundred patients undergoing ventral hernia repair were included and divided into laparoscopic and open repair groups. Postoperative outcomes were analyzed and compared.

Results: Laparoscopic repair was associated with reduced postoperative pain, shorter hospital stay, and lower wound complication rates. Operative time was longer in the laparoscopic group. Recurrence rates were comparable between both techniques.

Conclusion: Both laparoscopic and open ventral hernia repair are effective. Laparoscopic repair offers advantages in selected patients, particularly regarding postoperative recovery.

Keywords: Ventral hernia, Laparoscopic repair, Open repair, Comparative study.

Introduction

Ventral hernias comprise a heterogeneous group of abdominal wall defects that include umbilical, epigastric, paraumbilical, and incisional hernias. Among these, incisional hernias account for a significant proportion, developing in up to 20% of patients following abdominal surgery [1]. Factors such as obesity, wound infection, poor nutritional status, diabetes mellitus, and increased intra-abdominal pressure contribute to their development [2].

Surgical repair remains the definitive management for ventral hernias. Traditional open repair using primary suture techniques was associated with unacceptably high recurrence rates, leading to the routine use of prosthetic mesh reinforcement [3]. While open mesh repair significantly reduced recurrence, it was associated with wound complications including surgical site infection, seroma formation, and prolonged hospital stay [4].

The introduction of laparoscopic ventral hernia repair (LVHR) marked a significant advancement in hernia surgery. First described in the early 1990s, LVHR offered several potential advantages, including reduced tissue trauma, smaller incisions, improved visualization of the abdominal wall, and the ability to identify occult defects [5]. Subsequent studies demonstrated lower wound complication rates and faster postoperative recovery with laparoscopic repair compared with open techniques [6,7].

Despite these benefits, laparoscopic repair presents challenges such as longer operative time, higher initial costs, and a learning curve for surgeons. Concerns regarding intra-abdominal mesh placement, adhesion formation, and bowel injury have also been raised [8,9]. As a result, open ventral hernia repair continues to be widely practiced, particularly in large or complex hernias and in resource-limited settings [10].

Several randomized controlled trials and meta-analyses have compared laparoscopic and open ventral hernia repair, reporting mixed results regarding complications, recurrence, and cost-effectiveness [11–13]. Moreover, data from Indian tertiary care institutions remain limited. This prospective comparative study was undertaken to evaluate outcomes of laparoscopic versus open ventral hernia repair in a real-world clinical setting.

Materials and Methods

Study Design and Setting: This prospective comparative observational study was conducted at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, over a period of 12 months.

Study Population: A total of 100 adult patients diagnosed with ventral hernia and scheduled for elective surgical repair were included.

Inclusion Criteria: Patients aged ≥18 years with primary or incisional ventral hernia.

Exclusion Criteria: Patients with strangulated hernia, recurrent hernia requiring complex reconstruction, or those unfit for surgery.

Study Groups

Patients were allocated into:

- **Group A:** Laparoscopic ventral hernia repair
- **Group B:** Open ventral hernia repair

Outcome Measures: Operative time, postoperative pain, wound complications, length of hospital stay, and early recurrence.

Statistical Analysis: Data were analyzed using descriptive statistics. A p-value <0.05 was considered statistically significant.

Results and Discussion

The present study demonstrates that both laparoscopic and open ventral hernia repair are effective surgical approaches with comparable recurrence rates. Laparoscopic repair showed clear advantages in terms of reduced postoperative pain, fewer wound complications, and shorter hospitalization, findings consistent with previous studies [14–16].

Meta-analyses have consistently reported a significantly lower risk of surgical site infection with laparoscopic repair, particularly in obese and diabetic patients [17,18]. Reduced soft-tissue dissection and minimal mesh exposure are likely contributors to these outcomes.

Nevertheless, open repair remains an important option, especially in patients with large defects, dense adhesions, or limited access to laparoscopic facilities [19–21]. Cost considerations and surgeon expertise also influence technique selection in developing countries.

International guidelines emphasize individualized decision-making based on patient characteristics, hernia size, and institutional resources [24,25]. The findings of this study support these recommendations and provide valuable evidence from an Indian tertiary care setting.

Limitations: This was a single-center study with limited follow-up. Long-term recurrence and cost-effectiveness were not assessed.

Conclusion

Laparoscopic ventral hernia repair offers advantages in postoperative recovery and wound morbidity, while open repair remains a reliable option in selected patients. Surgical approach should be tailored to individual patient and institutional factors.

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