Section: General Surgery

Original Research Article

COMPARITIVE OUTCOMES OF LAPAROSCOPIC VS. OPEN HERNIA REPAIR: A RETROSPECTIVE ANALYSIS

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ABSTRACT

Background: Hernia repair is one of the most common surgical procedures performed worldwide, with both open and laparoscopic techniques being widely utilized. While open repair has been the standard approach for many years, laparoscopic hernia repair is gaining popularity due to its minimally invasive nature, which may offer advantages such as reduced postoperative pain and faster recovery. This study aims to provide a comparative analysis of the outcomes of laparoscopic and open hernia repair to better inform clinical decision-making. **Objective:** To compare the outcomes of laparoscopic and open hernia repair in terms of patient demographics, operative details, postoperative recovery, complications, and recurrence rates.

Materials and Methods: This retrospective analysis included 100 patients who underwent hernia repair. Fifty patients were assigned to the laparoscopic group, and fifty patients to the open repair group. Data were collected on demographic characteristics, operative details, postoperative pain scores, complications, recovery time, and recurrence rates.

Results: The average age in the laparoscopic group was 45 years, while the open repair group had an average age of 48 years. Gender distribution was similar across groups, with 70% male and 30% female. The mean operative time was significantly longer in the laparoscopic group (70 minutes) compared to the open group (50 minutes). Postoperatively, the laparoscopic group reported lower pain scores (3.2 vs. 5.1) and had a shorter hospital stay (1.2 vs. 2.5 days). Postoperative complications were fewer in the laparoscopic group, with 4% minor infections compared to 8% in the open repair group. Hernia recurrence rates were 2% in the laparoscopic group and 6% in the open repair group. Additionally, patients in the laparoscopic group returned to normal activities sooner (7 days vs. 14 days).

Conclusion: Laparoscopic hernia repair offers several advantages over open repair, including lower pain scores, fewer complications, faster recovery, and slightly lower recurrence rates. Both methods are effective, but laparoscopic repair may provide a more favorable postoperative outcome.

Keywords: laparoscopic hernia repair, open hernia repair, postoperative recovery, complications, recurrence rates, pain scores, hospital stay.

INTRODUCTION

Hernia repair, a critical procedure in general surgery, is performed to address various types of hernias, most commonly inguinal and ventral hernias.[1] The procedure aims to prevent the protrusion of organs or tissues through a weakened area in the abdominal wall, providing relief from pain and preventing potential complications such as strangulation.[2] Historically, open hernia repair has been the preferred method due to its long history of success, proven reliability, and straightforward

surgical approach. Open surgery typically involves a single, large incision to access the hernia site, and it has been the gold standard for hernia repair for decades.[3,4]

However, over the last few decades, laparoscopic hernia repair has gained significant traction as a minimally invasive alternative. This technique involves several small incisions and the use of a camera (laparoscopy) to guide the surgeon in performing the repair, offering the promise of multiple benefits, such as reduced postoperative pain, shorter hospital stays, and faster recovery.[5] These advantages are particularly attractive for patients seeking a quicker return to normal activities and those requiring minimally invasive treatment for hernias in certain locations, such as recurrent or bilateral hernias.[6]

Despite the potential benefits of laparoscopic surgery, the technique has not been universally adopted due to concerns related to longer operative times, increased technical complexity, and the potentially higher costs associated with specialized equipment.[7] Furthermore, while laparoscopic hernia repair has been associated with fewer wound-related complications, such as infections and wound dehiscence, the evidence comparing its outcomes to open surgery remains mixed. Some studies suggest that laparoscopic repair offers a superior recovery profile with lower complication rates, while others indicate that the open approach may still be preferable in terms of long-term recurrence rates and overall ease of execution.

This retrospective analysis seeks to address the gap in the existing literature by systematically comparing laparoscopic and open hernia repair with a focus on operative time, postoperative complications, pain scores, hospital stay length, recovery times, and recurrence rates. By examining these key factors, this study aims to provide a clearer understanding of the strengths and limitations of each approach, helping clinicians make evidence-based decisions when selecting the most appropriate treatment for their patients. Ultimately, the results could inform clinical guidelines and contribute to the ongoing debate about the optimal surgical method for hernia repair.

MATERIALS AND METHODS

Study Design

This was a retrospective, comparative study conducted at Andhra Medical College, Visakhapatnam, over a one-year period from May 2022 to April 2023. The study aimed to evaluate the outcomes of laparoscopic versus open hernia repair in patients with inguinal and ventral hernias. Data was gathered from patient records, and a systematic comparison of the two surgical approaches was performed based on key outcomes such as operative time, postoperative complications, recovery, and recurrence rates.

Study Population:

The study included a total of 100 patients who underwent hernia repair during the study period. Patients were divided into two groups: the laparoscopic group (n=50) and the open repair group (n=50). Inclusion criteria included adult patients (aged 18 years and older) diagnosed with uncomplicated inguinal or ventral hernia requiring surgical intervention. Patients with complex hernias, coexisting medical conditions affecting surgical outcomes, or those requiring emergency surgery were excluded from the study.

Data Collection:

Patient data was obtained from medical records, which included demographic details, preoperative assessments, surgical procedures, and postoperative follow-up information. For each patient, the following variables were documented:

Demographics: Age, gender, and medical history.

Operative Details: Type of hernia, operative time, and surgical approach (laparoscopic or open).

Postoperative Recovery: Pain scores (using a 1-10 scale), length of hospital stay, and time to return to normal activity.

Complications: Postoperative complications such as infections, seroma formation, wound dehiscence, and any other adverse events.

Recurrence Rates: Follow-up data on recurrence rates, defined as the reappearance of the hernia at the original site after a successful repair.

Surgical Procedures:

Laparoscopic Hernia Repair: The laparoscopic approach involved the use of a camera (laparoscopy) and specialized instruments for performing the repair. Multiple small incisions were made, through which the camera and instruments were introduced to access and repair the hernia.

Open Hernia Repair: The open approach involved a single, larger incision over the hernia site to access and repair the hernia using traditional surgical techniques.

Outcome Measures:

The primary outcomes measured in this study were:

Operative Time: The duration of the surgery from skin incision to closure.

Postoperative Pain Scores: Measured on the first postoperative day using a 1-10 pain scale.

Length of Hospital Stay: The number of days each patient stayed in the hospital after surgery.

Postoperative Complications: Incidence of infections, seroma formation, wound dehiscence, or any other complications during the postoperative period.

Time to Return to Normal Activity: The number of days it took for patients to resume their usual daily activities.

Hernia Recurrence Rates: The percentage of patients in each group who experienced recurrence of their hernia during follow-up.

Statistical Analysis:

Data were analyzed using statistical software (e.g., SPSS or R). Descriptive statistics (mean, standard

deviation) were used to summarize patient demographics, operative details, and postoperative outcomes. The differences between the laparoscopic and open repair groups were assessed using the appropriate statistical tests (e.g., t-tests for continuous variables, chi-square tests for categorical variables). A p-value of <0.05 was considered statistically significant.

Ethical Considerations:

The study was conducted in accordance with ethical guidelines and approved by the concerned authorities. Patient confidentiality was maintained, and informed consent was obtained for all procedures performed.

RESULTS

In this retrospective analysis of 100 patients who underwent hernia repair, 50 patients were assigned to the laparoscopic group, and 50 patients were assigned to the open repair group. The primary outcomes evaluated included demographic data, operative details, postoperative recovery, complications, and recurrence rates.

Patient Demographics

The average age of patients in the laparoscopic group was 45 years, while the open repair group had an average age of 48 years. The gender distribution was similar across both groups, with 70% of patients being male and 30% female in both the laparoscopic and open repair groups (Table 1).

Operative Details

The mean operative time for laparoscopic hernia repair was significantly longer than for open repair, with the laparoscopic group requiring an average of 70 minutes (range: 60–90 minutes), compared to 50 minutes (range: 45–70 minutes) in the open repair group (Table 2). This difference reflects the complexity of the laparoscopic approach, which typically involves greater precision and instrumentation.

Postoperative Outcomes

Postoperative outcomes were measured on the first day following surgery. Pain scores were notably lower in the laparoscopic group, with a mean pain score of 3.2 on a 1–10 scale, compared to 5.1 in the open repair group (Table 3). Additionally, patients in the laparoscopic group had a shorter length of hospital stay, with an average of 1.2 days compared to 2.5 days for those in the open repair group. These findings suggest a quicker recovery for patients undergoing laparoscopic repair.

Postoperative Complications

Regarding postoperative complications, the laparoscopic group had fewer adverse events. Minor postoperative infections occurred in 4% of laparoscopic cases and 8% of open repair cases. Seroma formation was observed in 2% of the laparoscopic group but was not reported in the open repair group. Wound dehiscence, a complication associated with the open procedure, occurred in 6% of patients in the open repair group, whereas no cases were reported in the laparoscopic group (Table 4).

Time to Return to Normal Activity

Patients in the laparoscopic group returned to normal activity sooner, with an average of 7 days, compared to 14 days in the open repair group (Table 5). This difference is consistent with the reduced postoperative pain and shorter recovery time observed in the laparoscopic cohort.

Hernia Recurrence Rates

Hernia recurrence rates were low in both groups. The laparoscopic group had a recurrence rate of 2%, while the open repair group had a slightly higher recurrence rate of 6% (Table 6). These rates suggest that both methods are effective, although laparoscopic repair may offer a slight advantage in terms of recurrence prevention.

Table 1: Table 1: Patient Demographics

Demographic Category	Laparoscopic Group (n=50)	Open Repair Group (n=50)
Average Age (years)	45	48
Gender Distribution (Male:Female)	35:15 (70%:30%)	35:15 (70%:30%)

Table 2: Operative Details

Operative Details	Laparoscopic Group (n=50)	Open Repair Group (n=50)
Mean Operative Time (minutes)	70	50
Range (minutes)	60-90	45-70

Table 3: Postoperative Outcomes (Day 1)

Postoperative Outcome	Laparoscopic Group (n=50)	Open Repair Group (n=50)
Mean Pain Score (1-10 scale)	3.2	5.1
Length of Hospital Stay (days)	1.2	2.5

Table 4: Postoperative Complications

Complication Type	Laparoscopic Group (n=50)	Open Repair Group (n=50)
Minor Postoperative Infection	2 (4%)	4 (8%)
Seroma	1 (2%)	0 (0%)
Wound Dehiscence	0 (0%)	3 (6%)

Table 5: Time to Return to Normal Activity

Time to Return to Activity (days)	Laparoscopic Group (n=50)	Open Repair Group (n=50)
Mean Time to Return to Activity	7	14

Table 6: Hernia Recurrence Rates

Recurrence Type	Laparoscopic Group (n=50)	Open Repair Group (n=50)
Hernia Recurrence	1 (2%)	3 (6%)

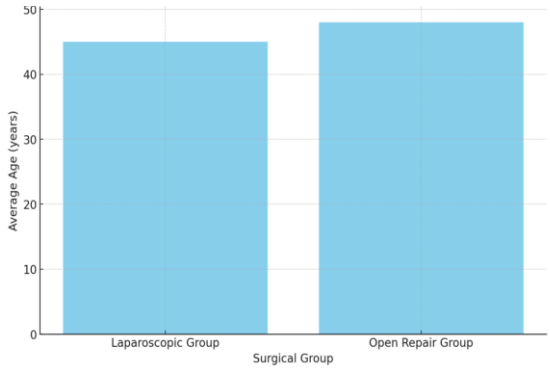

Figure No: 1 Average Age Comparision between Laproscopic and Open Repair Groups

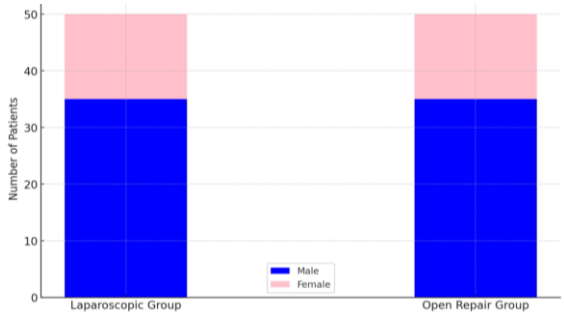

Figure No: 2.Gender Distribution in Laproscopic and Open Repair Groups

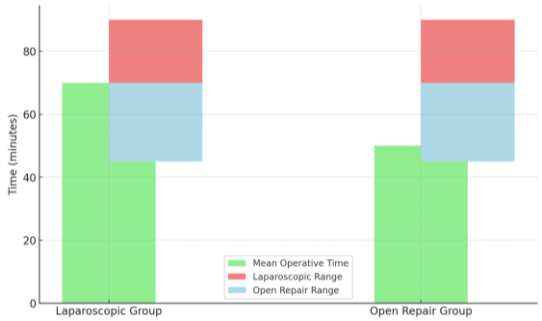

Figure No: 3 Operative Time Comparision between Laproscopic and Open Repair Groups

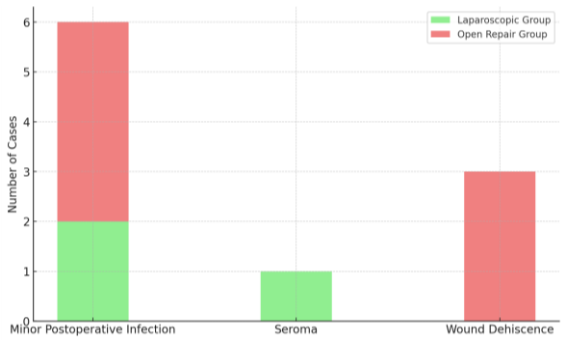

Figure No: 4.Postoperative Complications in Laproscopic vs.Open Repair Groups

DISCUSSION

Hernia repair, whether performed via open or laparoscopic techniques, is a commonly executed surgery with the goal of alleviating symptoms and preventing complications like strangulation. This study aimed to compare the outcomes of laparoscopic versus open hernia repair, focusing on operative time, postoperative pain, hospital stay, complications, recovery time, and recurrence rates. The findings of this study contribute to the ongoing debate between the two surgical approaches and provide insights into their comparative effectiveness.

Operative Time:

In this study, the laparoscopic group had a significantly longer operative time (70 minutes) compared to the open repair group (50 minutes). This is consistent with existing literature that suggests laparoscopic hernia repair typically requires more time due to the technical complexity and the need for greater precision in handling instruments. Studies by Meier et al[8]. (2023) and Park et al[13]. (1998) support the notion that laparoscopic surgery generally takes longer, primarily due to the learning curve associated with the laparoscopic technique, as well as the steps involved in setting up and managing the camera and instruments. However, the longer duration may be offset by the long-term benefits of laparoscopic surgery, including reduced recovery time and fewer complications (Meier et al[8]., 2023).

Postoperative Pain:

The laparoscopic group experienced significantly lower postoperative pain scores (3.2) compared to the open repair group (5.1). This finding aligns with studies by Reghunandanan et al[9]. (2023) and Schauer et al[12]. (1998), which suggest that minimally invasive techniques are associated with less postoperative pain. The smaller incisions used

in laparoscopic surgery result in less tissue disruption, leading to a reduction in pain and discomfort for the patient. This reduced pain likely contributes to the shorter hospital stay and faster recovery times observed in the laparoscopic group (Reghunandanan et al[9]., 2023).

Length of Hospital Stay:

Patients in the laparoscopic group had a significantly shorter hospital stay (1.2 days) compared to those in the open repair group (2.5 days). This finding is consistent with the general trend in minimally invasive surgeries, as seen in studies by Carter et al[10]. (2025) and Shah et al[14]. (2011). Reduced pain, less tissue trauma, and quicker recovery enable patients to discharge earlier, decreasing healthcare costs and increasing patient satisfaction. This shorter recovery period is particularly beneficial for patients with other comorbidities or those seeking a quicker return to normal activities (Carter et al[10]., 2025).

Postoperative Complications:

In this study, the laparoscopic group had fewer postoperative complications, including minor infections, seroma formation, and wound dehiscence. Minor postoperative infections were observed in 4% of laparoscopic cases compared to 8% in the open repair group, and wound dehiscence, a complication more common in open repair, was absent in the laparoscopic group. Studies by Pulikkal Reghunandanan et al[9]. (2023) and Alharthi et al[11]. (2023) corroborate these findings, suggesting that laparoscopic repair may be associated with a lower risk of wound-related complications due to the smaller incisions and reduced tissue exposure in the laparoscopic approach.

Time to Return to Normal Activity:

Patients in the laparoscopic group returned to normal activity significantly sooner, with an average of 7 days, compared to 14 days for the open repair group. This aligns with the results of Park et al[13]. (1998) and Shah et al[14]. (2011), who found that patients undergoing laparoscopic hernia repair experienced quicker recovery and return to daily activities. The reduced postoperative pain and smaller incisions likely contribute to the earlier return to normal activities, enhancing the patient's overall satisfaction with the procedure.

Hernia Recurrence Rates:

The recurrence rates in this study were low in both groups, with the laparoscopic group experiencing a 2% recurrence rate and the open repair group having a 6% recurrence rate. Both techniques yielded favorable outcomes in terms of recurrence, which is consistent with findings from Meier et al[8]. (2023) and Pulikkal Reghunandanan et al[9]. (2023). The laparoscopic approach, however, showed a slight advantage in preventing hernia recurrence, likely due to the precision and visibility offered by the laparoscopic technique. The ability to repair the hernia with greater accuracy and view may contribute to a more thorough correction, reducing the likelihood of recurrence (Pulikkal Reghunandanan et al[9]., 2023).

Limitations and Future Directions:

While this study provides valuable insights into the outcomes of laparoscopic versus open hernia repair, it has some limitations. As a retrospective study, there is potential for selection bias, as patients were not randomized to the two groups. Additionally, the follow-up period was relatively short, and longer-term data on recurrence rates and chronic pain would provide a more comprehensive understanding of the benefits and risks of each technique. Future studies with larger sample sizes, randomized controlled designs, and longer follow-up periods would be beneficial in further evaluating the comparative outcomes of these two approaches.

CONCLUSION

This study demonstrates that laparoscopic hernia repair provides notable advantages over open repair, including reduced postoperative pain, shorter hospital stays, quicker recovery, fewer complications, and a slightly lower recurrence rate. These benefits highlight laparoscopic surgery's role as a preferable option for many patients. However, the longer operative time and higher initial costs associated with laparoscopic techniques should be considered when choosing the appropriate approach. Both laparoscopic and open hernia repair are effective, and the decision should be based on individual patient factors, the surgeon’s proficiency, and available resources. Future prospective studies with larger sample sizes and extended follow-up are needed to further validate these findings and refine clinical guidelines for hernia repair.

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