

A comparative evaluation of laparoscopic and open inguinal hernia repair with respect to postoperative pain, recovery, recurrence and quality of life

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How to citation this article: Dr Vinod, Dr. Mohammad Riyaz, Dr Anil S, “A comparative evaluation of laparoscopic and open inguinal hernia repair with respect to postoperative pain, recovery, recurrence and quality of life”, IJMACR– September – 2026, Volume – 9, Issue – 5, P. No. 849 – 860.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Inguinal hernia is a common surgical condition for which both open and laparoscopic repair are widely used. Differences between these approaches may be reflected in postoperative pain, recovery, complications, recurrence, and quality of life. The present study compared these outcomes following laparoscopic and open inguinal hernia repair.

Materials and Methods: This hospital-based comparative observational study was conducted in the Department of General Surgery, Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka, from March 2025 to March 2026. A total of 60 adult patients undergoing elective inguinal hernia repair were included

and divided into laparoscopic (n=30) and open (n=30) groups. Postoperative pain, analgesic requirement, time to ambulation, hospital stay, return to routine activities, postoperative complications, recurrence, and quality of life were assessed. Continuous variables were expressed as mean $\pm$ standard deviation and categorical variables as frequencies and percentages. A p-value <0.05 was considered statistically significant.

Results: The laparoscopic group had significantly lower postoperative pain scores at 6 hours (4.2 ± 1.1 vs. 5.6 ± 1.2), 24 hours (3.1 ± 0.9 vs. 4.4 ± 1.0), 48 hours (2.0 ± 0.8 vs. 2.9 ± 0.9), and at discharge (1.2 ± 0.6 vs. 1.7 ± 0.7 ; $p<0.001$, $p<0.001$, $p<0.001$, and $p=0.005$, respectively). Analgesic requirement was lower in the laparoscopic

group ($p=0.028$). Mean time to ambulation (8.6 ± 2.1 vs. 13.4 ± 3.2 hours), hospital stay (2.1 ± 0.7 vs. 3.0 ± 0.9 days), and return to routine activities (10.2 ± 2.8 vs. 15.1 ± 3.6 days) were significantly shorter following laparoscopic repair (all $p<0.001$). At least one postoperative complication occurred in 20.0% of laparoscopic and 40.0% of open-repair patients. Recurrence occurred in 3.3% and 6.7%, respectively. Good quality of life was reported by 76.7% of laparoscopic patients compared with 53.3% of open-repair patients ($p=0.047$).

Conclusion: Laparoscopic inguinal hernia repair was associated with lower postoperative pain and analgesic requirement, faster functional recovery, shorter hospital stay, and better quality-of-life outcomes compared with open repair. Recurrence was uncommon in both groups, while complications were numerically less frequent following laparoscopic repair.

Keywords: Inguinal Hernia, Laparoscopic Repair, Open Repair; Postoperative Pain, Recovery, Analgesic Requirement, Recurrence, Quality of Life, Postoperative Complications.

Introduction

Inguinal hernia is among the most frequently encountered surgical conditions in adults and represents a substantial proportion of the workload of general surgical practice. More than 20 million groin hernia repairs are performed worldwide each year, emphasizing the considerable clinical burden associated with this condition. Surgical repair remains the definitive treatment for symptomatic inguinal hernia, and contemporary international guidelines recognize both open and laparo-endoscopic techniques as established approaches for elective repair. The choice of technique is influenced by patient characteristics, hernia-related factors, surgeon expertise,

and availability of appropriate resources.¹ The updated HerniaSurge guidelines further emphasize individualized decision-making and evidence-based selection of the operative approach.²

Open anterior repair has traditionally been widely used because of its established technique, relatively straightforward operative requirements, and applicability to a broad range of patients. Laparoscopic inguinal hernia repair, particularly transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) approaches, provides posterior access to the inguinal region and has become an important alternative to open repair. Large evidence syntheses have demonstrated that laparoscopic repair is generally associated with a longer operative duration but may provide advantages in postoperative recovery and persistent pain.^{3,4}

The comparative effectiveness of laparoscopic and open repair has been investigated extensively. The EU Hernia Trialists Collaboration evaluated randomized trials involving more than 7000 participants and reported that laparoscopic repair required longer operating time but was associated with faster return to usual activities and less persistent pain and numbness. Recurrence was not clearly different when laparoscopic repair was compared with open mesh repair.³ A subsequent Cochrane review similarly identified faster recovery and less persistent pain following laparoscopic repair, while noting the possibility of increased risk of certain rare serious intraoperative complications.⁴

Postoperative pain is an important outcome following inguinal hernia repair because it can affect patient comfort, mobility, analgesic requirements, and return to routine activities. A meta-analysis of randomized clinical trials by Memon et al. demonstrated differences in postoperative outcomes between laparoscopic and open

repair, including earlier discharge and faster return to normal activity following laparoscopic surgery.⁵ More recent evidence has focused specifically on patient-reported outcomes. Patterson et al., in a systematic review and meta-analysis of randomized controlled trials, found lower patient-reported postoperative pain following laparoscopic repair at several periods of follow-up, together with less paraesthesia and differences in patient satisfaction.⁶

Recovery is another clinically relevant outcome when comparing operative techniques. Early ambulation, shorter hospitalization, and earlier return to normal activities can reduce the functional burden of surgery. The Health Technology Assessment by McCormack et al., which evaluated randomized and quasi-randomized evidence, reported faster return to usual activities and less persisting pain and numbness following laparoscopic repair, although operative time was longer.⁷

Recurrence remains one of the principal long-term outcomes after inguinal hernia repair. Evidence regarding recurrence has not been completely uniform. The large randomized trial by Neumayer et al. reported higher two-year recurrence after laparoscopic mesh repair than after open mesh repair in their study population, particularly among patients with primary hernias.⁸ In contrast, subsequent systematic evidence has generally failed to demonstrate a consistent statistically significant difference in recurrence between contemporary laparoscopic and open mesh techniques. A systematic review by Bullen et al. found no significant difference in recurrence between the two approaches for primary unilateral uncomplicated inguinal hernia.⁹

The broader evidence base also indicates that outcomes may vary according to the specific operative technique, surgeon experience, and patient population. An overview

of systematic reviews by Haladu et al. found that most systematic reviews did not demonstrate a significant difference in recurrence between laparoscopic and open repair, while laparoscopic repair was generally associated with less chronic groin pain.¹⁰

Appropriate technical expertise is particularly important for laparoscopic repair. The International Endohernia Society guidelines provide detailed recommendations for TAPP and TEP procedures and emphasize standardized technical principles for safe and effective laparoscopic inguinal hernia surgery.¹⁰ Because the present study was designed around a comparison of laparoscopic and open repair rather than comparison of TAPP versus TEP, these technical considerations provide important background for interpreting differences in postoperative outcomes.

Quality of life is increasingly recognized as an important patient-centered outcome after inguinal hernia repair. Pain, physical functioning, ability to perform daily activities, postoperative symptoms, and overall well-being may influence the patient's perception of recovery even in the absence of major surgical complications. Evidence from randomized trials indicates that patient-reported outcomes can differ between laparoscopic and open techniques, supporting the inclusion of quality-of-life assessment in comparative surgical studies.⁶

Therefore, the present study was undertaken to comparatively evaluate laparoscopic and open inguinal hernia repair with respect to postoperative pain, analgesic requirement, recovery, postoperative complications, recurrence, and quality of life. The study aimed to assess the differences in these clinically relevant outcomes among adult patients undergoing elective inguinal hernia repair in a hospital-based surgical setting.

Materials and Methods

Study Design and Setting

This was a hospital-based comparative observational study conducted in the Department of General Surgery, Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka. The study was conducted over a period of 13 months, from March 2025 to March 2026. The study was designed to compare laparoscopic and open inguinal hernia repair with respect to postoperative pain, recovery, recurrence, and quality of life.

Study Population

The study included adult patients diagnosed with inguinal hernia who underwent surgical repair in the Department of General Surgery during the study period. A total of 60 patients fulfilling the predefined eligibility criteria were included in the study.

Sample Size

A total sample size of 60 patients was included. The patients were divided into two groups according to the surgical technique performed:

- **Group A:** 30 patients undergoing laparoscopic inguinal hernia repair.
- **Group B:** 30 patients undergoing open inguinal hernia repair.

Study Objectives

The primary objective was to compare laparoscopic and open inguinal hernia repair with respect to postoperative pain and recovery.

The secondary objectives were to compare the two techniques regarding recurrence and quality of life during the documented follow-up period.

Inclusion Criteria

Patients fulfilling the following criteria were included:

1. Adult patients diagnosed with inguinal hernia.

2. Patients undergoing elective surgical repair during the study period.
3. Patients undergoing either laparoscopic or open inguinal hernia repair.
4. Patients willing to participate in postoperative follow-up and quality-of-life assessment.

Exclusion Criteria

Patients were excluded if they:

1. Did not undergo definitive surgical repair.
2. Had complicated hernia requiring emergency surgery.
3. Had recurrent hernia requiring re-repair.
4. Had associated conditions that could significantly interfere with assessment of postoperative pain or recovery.
5. Were unable to complete the required postoperative follow-up.

Data Collection

Relevant demographic and clinical information was collected from the patients and hospital records using a structured data collection format. The recorded parameters included age, sex, clinical presentation, side of hernia, type of surgical procedure, operative details, postoperative course, complications, and follow-up findings.

Surgical Procedure

Patients underwent either laparoscopic or open inguinal hernia repair according to the surgical approach selected by the treating surgical team. In the laparoscopic group, minimally invasive inguinal hernia repair was performed using the institutional surgical protocol. In the open group, conventional open inguinal hernia repair was performed using the standard operative technique. Mesh repair was performed according to the operative plan and clinical requirements.

Details regarding the operative procedure, duration of surgery, intraoperative findings, and immediate postoperative course were documented.

Assessment of Postoperative Pain

Postoperative pain was assessed using a standardized pain assessment scale during the postoperative period. Pain scores were recorded at predefined postoperative time points and compared between the laparoscopic and open repair groups. The requirement for postoperative analgesics was also documented where available.

Assessment of Recovery

Postoperative recovery was assessed using relevant clinical parameters recorded during hospitalization and follow-up. These included time to ambulation, return to routine activities, and duration of hospital stay. Recovery parameters were compared between the two surgical groups.

Assessment of Recurrence

Patients were followed up after surgery for evidence of recurrent inguinal hernia. Recurrence was assessed clinically during follow-up visits and documented in the hospital records. Recurrence occurring during the documented follow-up period was compared between the laparoscopic and open repair groups.

Assessment of Quality of Life

Quality of life was assessed postoperatively using a standardized quality-of-life assessment approach. Patients were evaluated regarding the effect of surgery on physical functioning, daily activities, postoperative symptoms, and overall well-being during follow-up. The findings were compared between the laparoscopic and open repair groups.

Postoperative Complications

Patients were monitored during the postoperative period for complications related to the surgical procedure.

Relevant complications such as surgical site infection, seroma, hematoma, urinary retention, postoperative pain, and other documented adverse events were recorded and compared between the two groups.

Follow-up

Patients were followed up after surgery according to the institutional follow-up schedule. During follow-up, postoperative recovery, persistent symptoms, recurrence, complications, and quality-of-life parameters were assessed and documented.

Statistical Analysis

The collected data were entered into a structured database and analyzed using appropriate statistical methods. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. Continuous variables between the laparoscopic and open groups were compared using an appropriate independent statistical test, while categorical variables were analyzed using the Chi-square test or Fisher's exact test, as appropriate. A p-value <0.05 was considered statistically significant.

Results and Observations

A total of 60 patients undergoing surgical repair of inguinal hernia were included in the present study. Patients were divided equally into two groups: Group A (laparoscopic repair, n=30) and Group B (open repair, n=30). The two groups were compared with respect to demographic characteristics, postoperative pain, recovery, postoperative complications, recurrence, and quality of life.

Table 1: Demographic characteristics of the study population

Characteristic	Laparoscopic (n=30)	Open (n=30)	Total (n=60)
Age (years)			
<40	7 (23.3%)	6 (20.0%)	13 (21.7%)
40–49	8 (26.7%)	7 (23.3%)	15 (25.0%)
50–59	8 (26.7%)	9 (30.0%)	17 (28.3%)
≥60	7 (23.3%)	8 (26.7%)	15 (25.0%)
Sex			
Male	28 (93.3%)	27 (90.0%)	55 (91.7%)
Female	2 (6.7%)	3 (10.0%)	5 (8.3%)

Observation: The study population showed a marked male predominance. The distribution of age and sex was broadly comparable between the two groups.

Table 2: Clinical characteristics of patients

Clinical characteristic	Laparoscopic n (%)	Open n (%)	Total n (%)
Groin swelling	30 (100.0)	30 (100.0)	60 (100.0)
Groin pain	19 (63.3)	21 (70.0)	40 (66.7)
Reducible swelling	27 (90.0)	26 (86.7)	53 (88.3)
Right-sided hernia	17 (56.7)	16 (53.3)	33 (55.0)
Left-sided hernia	11 (36.7)	12 (40.0)	23 (38.3)
Bilateral hernia	2 (6.7)	2 (6.7)	4 (6.7)

Observation: Groin swelling was present in all patients. Right-sided hernia was slightly more common than left-sided hernia, while bilateral hernia was observed in a small proportion.

Table 3: Operative characteristics

Operative parameter	Laparoscopic (n=30)	Open (n=30)
Mean operative time (min)	68.4 ± 12.6	54.7 ± 10.8
Mean intraoperative blood loss (mL)	24.3 ± 8.5	31.6 ± 10.2
Bilateral repair performed	2 (6.7%)	2 (6.7%)
Drain placement	3 (10.0%)	5 (16.7%)

Observation: The laparoscopic procedure showed a longer mean operative time, whereas mean intraoperative blood loss was lower compared with open repair.

Table 4: Postoperative pain scores

Time of assessment	Laparoscopic (Mean ± SD)	Open (Mean ± SD)	p-value
6 hours	4.2 ± 1.1	5.6 ± 1.2	<0.001
24 hours	3.1 ± 0.9	4.4 ± 1.0	<0.001
48 hours	2.0 ± 0.8	2.9 ± 0.9	<0.001
At discharge	1.2 ± 0.6	1.7 ± 0.7	0.005

Observation: Patients undergoing laparoscopic repair had lower postoperative pain scores at all assessed time points compared with patients undergoing open repair.

Table 5: Postoperative analgesic requirement

Analgesic requirement	Laparoscopic (n=30)	Open (n=30)	p-value
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Low requirement	20 (66.7%)	11 (36.7%)	
Moderate requirement	9 (30.0%)	15 (50.0%)	
High requirement	1 (3.3%)	4 (13.3%)	
Overall comparison			0.028

Observation: A lower postoperative analgesic requirement was observed in the laparoscopic group compared with the open group.

Table 6: Recovery parameters

Recovery parameter	Laparoscopic (n=30)	Open (n=30)	p-value
Time to ambulation (hours)	8.6 ± 2.1	13.4 ± 3.2	<0.001
Duration of hospital stay (days)	2.1 ± 0.7	3.0 ± 0.9	<0.001
Return to routine activities (days)	10.2 ± 2.8	15.1 ± 3.6	<0.001

Observation: Patients in the laparoscopic group demonstrated earlier ambulation, shorter hospital stay, and earlier return to routine activities compared with the open group.

Table 7: Postoperative complications

Complication	Laparoscopic (n=30)	Open (n=30)	Total
Surgical site infection	1 (3.3%)	3 (10.0%)	4 (6.7%)
Seroma	2 (6.7%)	3 (10.0%)	5 (8.3%)

Hematoma	1 (3.3%)	2 (6.7%)	3 (5.0%)
Urinary retention	1 (3.3%)	3 (10.0%)	4 (6.7%)
Persistent postoperative pain	2 (6.7%)	5 (16.7%)	7 (11.7%)
Patients with ≥1 complication	6 (20.0%)	12 (40.0%)	18 (30.0%)

Observation: Postoperative complications were less frequent in the laparoscopic group. Persistent postoperative pain was the most frequently documented complication overall.

Table 8: Recurrence during follow-up

Recurrence	Laparoscopic (n=30)	Open (n=30)	Total (n=60)
No recurrence	29 (96.7%)	28 (93.3%)	57 (95.0%)
Recurrence	1 (3.3%)	2 (6.7%)	3 (5.0%)

Observation: Recurrence was uncommon in both groups, with a slightly higher proportion observed following open repair.

Table 9: Postoperative quality-of-life assessment

Quality-of-life category	Laparoscopic (n=30)	Open (n=30)	p-value
Good	23 (76.7%)	16 (53.3%)	
Moderate	6 (20.0%)	11 (36.7%)	
Poor	1 (3.3%)	3 (10.0%)	
Overall comparison			0.047

Observation: A greater proportion of patients in the laparoscopic group reported good postoperative quality of life compared with the open group.

Discussion

The present hospital-based comparative observational study evaluated 60 adult patients undergoing elective inguinal hernia repair, comprising 30 patients in the laparoscopic group and 30 patients in the open group. The study assessed postoperative pain, analgesic requirement, recovery, postoperative complications, recurrence, and quality of life. Overall, patients undergoing laparoscopic repair demonstrated lower postoperative pain scores, lower analgesic requirements, earlier ambulation, shorter hospital stay, earlier return to routine activities, and a higher proportion of good quality-of-life outcomes. Recurrence was uncommon in both groups.

The demographic profile showed a marked male predominance, with males accounting for 91.7% of the total study population. Patients were distributed across all predefined age categories, and the age distribution was broadly comparable between the two groups. This pattern is consistent with the established epidemiology of groin hernia, which predominantly affects adult men. Contemporary international guidelines identify groin hernia repair as one of the most commonly performed surgical procedures worldwide.¹

The clinical presentation was broadly similar between the groups. Groin swelling was present in all patients, while groin pain was reported by 63.3% of patients in the laparoscopic group and 70.0% in the open group. Most patients had reducible swelling. Right-sided hernias were slightly more frequent than left-sided hernias, while bilateral hernias constituted a small proportion of the study population. These findings indicate that the two

groups had broadly comparable presenting characteristics.

The mean operative time was longer in the laparoscopic group than in the open group, measuring 68.4 ± 12.6 minutes and 54.7 ± 10.8 minutes, respectively. This finding is consistent with previous evidence. The EU Hernia Trialists Collaboration reported longer operating times for laparoscopic repair compared with open repair, and the Cochrane review reached a similar conclusion.^{2,3} Memon et al. also demonstrated a significant increase in operative duration with laparoscopic repair, with a mean difference of approximately 15 minutes.⁴

The longer operative duration of laparoscopic repair may be related to the technical requirements of minimally invasive surgery, including creation of the operative working space, posterior dissection, mesh placement, and laparoscopic instrumentation. However, operative time should not be considered in isolation because the present study demonstrated more favorable postoperative recovery outcomes in the laparoscopic group.

Mean blood loss was numerically lower in the laparoscopic group, at 24.3 ± 8.5 mL compared with 31.6 ± 10.2 mL in the open group. Because no statistical test was provided for this outcome, the difference should be interpreted descriptively. Both procedures were associated with relatively low blood loss, suggesting that significant intraoperative hemorrhage was uncommon in this study population.

A major finding of the present study was the significantly lower postoperative pain observed following laparoscopic repair. Mean pain scores were 4.2 ± 1.1 versus 5.6 ± 1.2 at 6 hours, 3.1 ± 0.9 versus 4.4 ± 1.0 at 24 hours, 2.0 ± 0.8 versus 2.9 ± 0.9 at 48 hours, and 1.2 ± 0.6 versus 1.7 ± 0.7 at discharge in the laparoscopic and open groups,

respectively. The differences were statistically significant at all assessed time points.

The lower pain observed in the present study is consistent with previous evidence. The EU Hernia Trialists Collaboration reported less persisting pain following laparoscopic repair, while subsequent systematic reviews have also documented advantages in pain-related outcomes.^{2,3} Patterson et al., in a meta-analysis of 58 randomized controlled trials, found significantly lower patient-reported pain following laparoscopic repair during multiple periods of follow-up.⁶

The reduction in pain was accompanied by a significantly lower analgesic requirement in the laparoscopic group. Low analgesic requirement was observed in 66.7% of laparoscopic patients compared with 36.7% of open-repair patients, whereas moderate and high analgesic requirements were more common in the open group. The overall difference was statistically significant ($p=0.028$). This finding is clinically relevant because reduced postoperative pain and analgesic requirement may facilitate early mobilization and improve patient comfort. Previous systematic evidence has similarly demonstrated favorable pain-related outcomes after laparoscopic repair.^{3,6}

Recovery outcomes demonstrated a consistent difference between the groups. Mean time to ambulation was 8.6 ± 2.1 hours following laparoscopic repair compared with 13.4 ± 3.2 hours following open repair ($p<0.001$). Hospital stay was also shorter in the laparoscopic group, at 2.1 ± 0.7 days compared with 3.0 ± 0.9 days ($p<0.001$). Similarly, return to routine activities occurred at 10.2 ± 2.8 days in the laparoscopic group compared with 15.1 ± 3.6 days in the open group ($p<0.001$).

These findings are consistent with previous comparative evidence. Memon et al. reported earlier discharge and

faster return to normal activity following laparoscopic repair.⁴ The Health Technology Assessment by McCormack et al. also reported faster return to usual activities and less persisting pain and numbness following laparoscopic repair.⁷

The shorter hospital stay observed in the laparoscopic group may be related to the combination of reduced pain, lower analgesic requirement, and earlier mobilization. Nevertheless, duration of hospitalization can also be influenced by institutional discharge protocols, postoperative monitoring, and patient-related factors. Therefore, this result should be interpreted within the context of the present single-center observational study. Postoperative complications were numerically less frequent in the laparoscopic group. At least one recorded complication occurred in 20.0% of laparoscopic patients compared with 40.0% of open-repair patients. Surgical-site infection, seroma, hematoma, urinary retention, and persistent postoperative pain were individually more frequent in the open group. Persistent postoperative pain was the most frequent individual complication.

Previous evidence has demonstrated variation in complication outcomes between laparoscopic and open repair. Memon et al. reported fewer postoperative complications with laparoscopic repair in their meta-analysis.⁴ Similarly, the Health Technology Assessment reported fewer wound or superficial infections and hematomas with laparoscopic repair, although laparoscopic procedures were associated with a higher risk of certain serious visceral complications.⁷

In contrast, the large randomized trial by Neumayer et al. reported a higher overall complication rate following laparoscopic repair compared with open repair.⁵ The same trial also demonstrated differences according to hernia type and reported higher recurrence following

laparoscopic repair in patients with primary hernias.⁵ These differences between studies indicate that complication and recurrence outcomes may be influenced by operative technique, surgeon experience, patient selection, and the specific definition of complications.

Persistent postoperative pain occurred in 6.7% of laparoscopic patients compared with 16.7% of open-repair patients in the present study. This finding is in accordance with broader evidence showing reduced persistent or chronic groin pain following laparoscopic repair. Patterson et al. reported lower patient-reported pain and paraesthesia following laparoscopic repair, while the overview by Haladu et al. found that most systematic reviews reported lower chronic groin pain with laparoscopic approaches.^{6,8}

Recurrence was uncommon in both groups. One patient (3.3%) in the laparoscopic group and two patients (6.7%) in the open group developed recurrence. Although recurrence was numerically more frequent in the open group, no statistical comparison was provided; therefore, the present study does not establish a statistically significant difference in recurrence.

The literature concerning recurrence is not completely uniform. The randomized trial by Neumayer et al. reported a higher recurrence rate following laparoscopic repair in primary hernias.⁵ In contrast, Bullen et al., in a systematic review and meta-analysis of randomized trials involving primary unilateral uncomplicated inguinal hernia, found no significant difference in recurrence between open and laparoscopic mesh repair.⁹

Similarly, Haladu et al. reviewed systematic reviews of randomized controlled trials and found that most reviews did not demonstrate a significant difference in recurrence between laparoscopic and open repair.⁸ The earlier EU Hernia Trialists Collaboration also reported that

recurrence following laparoscopic repair was not different from open mesh repair, although laparoscopic repair differed from open non-mesh techniques.² Thus, the low recurrence rates observed in both groups in the present study are compatible with much of the contemporary evidence, although the small sample size and limited follow-up restrict definitive conclusions.

Quality of life was significantly better distributed in the laparoscopic group. Good quality of life was reported in 76.7% of laparoscopic patients compared with 53.3% of open-repair patients, while poor quality of life was observed in 3.3% and 10.0%, respectively. The overall difference was statistically significant ($p=0.047$).

The quality-of-life findings are supported by evidence emphasizing the importance of patient-reported outcomes after inguinal hernia surgery. Patterson et al. demonstrated differences in patient-reported pain, paraesthesia, and satisfaction between laparoscopic and open techniques.⁶ Because quality of life incorporates several dimensions of postoperative recovery, including symptoms, physical functioning, daily activities, and overall well-being, the higher proportion of good quality of life in the present laparoscopic group may reflect the combined effect of lower pain and faster functional recovery.

The present findings should also be considered in relation to contemporary surgical guidance. The updated HerniaSurge guidelines emphasize that both open and laparo-endoscopic repair are established approaches and that selection should consider patient factors, hernia characteristics, surgical expertise, and available resources.¹ The International Endohernia Society guidelines similarly provide detailed technical recommendations for TAPP and TEP repair and

emphasize appropriate operative technique and expertise for laparoscopic surgery.¹⁰

The overall pattern of findings in the present study—lower postoperative pain, lower analgesic requirement, earlier ambulation, shorter hospital stay, earlier return to routine activities, and better distribution of quality-of-life outcomes—corresponds broadly with the evidence from randomized trials and systematic reviews.^{2-4,6-9} At the same time, the literature demonstrates that recurrence and complication outcomes are not uniformly different between the two approaches, and individual randomized trials have produced contrasting results.^{5,8,9} Therefore, the present findings should be interpreted as associations observed in this hospital-based cohort rather than definitive evidence that one operative approach is universally preferable.

The study has several limitations. First, the sample size was relatively small, with only 60 patients recruited from a single institution. Second, the observational design means that the operative approach was selected by the treating team rather than randomly assigned, and selection bias or residual confounding cannot therefore be excluded. Third, recurrence and quality-of-life outcomes may require longer follow-up to adequately assess long-term differences. Finally, statistical comparisons were not provided for operative time, blood loss, individual complications, or recurrence; these outcomes should consequently be interpreted descriptively.

Despite these limitations, the present study provides a comprehensive comparison of important perioperative and patient-centered outcomes following laparoscopic and open inguinal hernia repair. Within the limitations of the study design and sample size, laparoscopic repair was associated with significantly lower postoperative pain and analgesic requirement, earlier postoperative recovery, and

a higher proportion of patients with good quality of life. Recurrence was uncommon in both groups, while complications were numerically less frequent in the laparoscopic group. These findings support the importance of evaluating postoperative recovery and patient-reported outcomes alongside conventional surgical endpoints when comparing inguinal hernia repair techniques.

Conclusion

Laparoscopic inguinal hernia repair was associated with significantly lower postoperative pain and analgesic requirement, earlier ambulation, shorter hospital stay, earlier return to routine activities, and a higher proportion of patients reporting good quality of life compared with open repair. Recurrence was uncommon in both groups, while postoperative complications were numerically less frequent following laparoscopic repair. Within the limitations of the small, single-center observational study, laparoscopic repair demonstrated favorable postoperative and patient-centered outcomes.

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