

Early Postoperative Pain: Open Versus Laparoscopic Unilateral Inguinal Hernia Repair

Saba Manzoor¹, Rizwan Sultan², Riaz Hussain³, Ayesha Javed⁴, Hira Jalil⁵, Nadeem Abbas⁶

¹Posgraduate Trainee,

²Associate Professor,

³Professor, General Surgery,

⁴Consultant, General Surgery,

⁵Assistant Professor,

⁶Assistant Professor, General Surgery, National Engineering & Scientific Commission in Islamabad

Author's Contribution

^{1,5}Substantial contributions to the conception or design of the work; or the acquisition, interpretation of data for the work, ^{1,5,6}Drafting the work or revising it critically for important intellectual content, ³Final approval of the version to be published, ⁴Active participation in active methodology, Literature review

Conflict of interest: None

Funding source: None

Article received: 26-01-26

Article accepted: 28-05-26

Correspondence

Saba Manzoor

subbamanzoor@gmail.com

ABSTRACT

Objective: To compare the early postoperative pain at 24 hours between laparoscopic and open unilateral inguinal hernia repair.

Methodology: Cohort study conducted at the Department of Surgery, Islamabad Medical Complex, Islamabad from 1st January 2025 to 31st May 2025. A total of 60 patients with unilateral inguinal hernia were divided equally into laparoscopic and open Lichtenstein repair groups. Postoperative pain was assessed using a Visual Analog Scale (VAS) at 24 hours. Secondary outcomes included operative time, length of hospital stay, postoperative analgesia use and complications based on patient fitness and surgeon discretion.

Results: The median (IQR) VAS pain score at 24 hours was significantly lower in the laparoscopic group [4.0 (3.0–4.0)] than in the open repair group [5.0 (5.0–6.0); $p < 0.001$]. Median (IQR) operative time was longer in the laparoscopic group [46.5 min (45.0–50.0)] than in the open group [31.0 min (27.0–35.0); $p < 0.005$], whereas median (IQR) hospital stay was shorter [1.0 day (1.0–2.0) versus 2.0 days (2.0–3.0); $p < 0.005$]. Additional postoperative analgesia was used by 5 (16.67%) in laparoscopic and 9 (30.0%) in open-repair patients and no postoperative complication occurred in the laparoscopic group, while 1 (3.33%) superficial surgical site infection occurred in the open group.

Conclusion: Laparoscopic inguinal hernia repair is associated with significantly reduced early postoperative pain compared to open Lichtenstein repair, despite longer operative times. These findings support the feasibility and patient centered advantages of minimally invasive hernia repair in the local population, highlighting its potential to improve early recovery and postoperative comfort.

Introduction

Laparoscopic inguinal hernia repair has been standard of care for bilateral inguinal hernia for last 15 years according to the guidelines. For unilateral inguinal hernia, there is no consensus standardization because of no significant difference in long term outcomes. Requirement of GA and size of hernia are also limiting factors¹.

Chronic pain after open hernial repair surgery is another important issue because it can interfere with recovery and quality of life of patient². Open surgical repair is associated with low recurrence rates, easier access and shorter operative time and it can be performed under local anesthesia. Whereas, laparoscopic surgical repair of hernia has its own advantages including less post operative pain³. Physical function, post operative pain, cosmetic satisfaction and duration until resuming routine activities are the parameters that directly mirror the patient's viewpoint and quality of life post surgery. These outcomes are progressively viewed as crucial standards for assessing contemporary surgical interventions⁴.

At present, there is a critical gap in Pakistan's healthcare landscape regarding patient centered research assessing the comparative benefits of laparoscopic versus open hernia repair in unilateral inguinal hernia in the local

population. Research conducted in Western and various Asian countries has shown that laparoscopic techniques may lead to poorer short term outcomes and patient satisfaction. However, there is a limited understanding of the feasibility, cost-effectiveness and long term advantages of laparoscopic procedures in low to middle income countries (LMICs) like Pakistan, where economic limitations and inadequate healthcare access impact treatment choices⁵.

The purpose of this study is to measure early post operative pain at 24 hours in patients with unilateral inguinal hernia undergoing open and laparoscopic hernia repair in our setting. It was achieved by making comparison of intensity of early post operative pain at 24 hours in these patients who are undergoing open versus laparoscopic unilateral inguinal hernia repair.

Methodology

A cohort study was conducted over a period of 5 months starting from 1st January 2025 to 31st May 2025 at the Department of Surgery, Islamabad Medical Complex, Islamabad. Ethical approval was obtained

from the Institutional Review Board as NESCOM-44(33)/2025-IMC and written informed consent was collected from each participant.

Sample size was calculated using the "Sample Size for Comparing Two Means" in the OpenEpi sample size calculator. The calculation used the difference between the mean 24 hours postoperative VAS pain scores reported by Garg et al⁶ with mean $\pm$ SD of 2.5 ± 1.1 in the laparoscopic group and 3.8 ± 1.3 in the open group (mean difference of 1.3). At a confidence level of 95%, 5% margin of error, 80% power of study and 1:1 group ratio, the estimated sample size came out to be 28 being 14 participants in each group. It was conservatively increased to 60 participants to meet the minimum requirement of sample size. Non-probability convenient sampling technique was used to enroll the participants.

Participants were then divided into two groups with each group containing 30 participants. Group A was set to undergo laparoscopic hernia repair whereas group B was to undergo open inguinal surgical repair. All the patients aged 10-65 years, having unilateral inguinal hernia confirmed on physical examination were included whereas those patients who were previously diagnosed with any severe uncontrolled systemic illness, end stage malignancies and poor candidates of surgery were excluded from the study. Those patients who met the inclusion criteria were admitted in the surgical ward a day prior to the surgery.

Data was collected in a predesigned proforma. Variables included age, gender, comorbidity score (according to the Charlson Comorbidity Index) and ASA (American Society of Anesthesiologists Classification) score. The information of intraoperative surgery was based on the type of surgical procedure being performed and the operation duration. Use of Injection Paracetamol and Injection Ketorolac was considered as the standard post-operative analgesic for every patient. Any additional analgesic if used was also recorded.

Post-operative pain being the primary outcome was assessed using Visual Analogue Scale (VAS) after 24 hours of surgery. This scale is used for pain assessment

and is scored from 0 – 10 Likert scale ratings making a score total of 10. 0 which denotes no pain at all and 10 indicating as worst pain ever experienced by the patient.

Data was analyzed using SPSS version 27.0.1. Categorical data was expressed as percentages and frequencies and comparison between the two groups was done using Chi-square test. Continuous data was expressed as mean $\pm$ standard deviation and median (IQR), as appropriate and compared using the independent-samples t-test or Mann-Whitney U test, respectively. $p \leq 0.05$ was considered statistically significant.

Results

Our study consisted of 60 patients, with 30 patients in the laparoscopic hernia repair (group A) and 30 patients in the open surgical repair group (group B). The mean age was 52.97 ± 10.34 years in the laparoscopic group and 47.50 ± 12.80 years in the open group ($p=0.289$). In the laparoscopic group, 17 patients had ASA grade I, 12 had ASA grade II, and 1 had ASA grade III whereas the corresponding counts in the open group were 19, 11, and 0 respectively. Charlson comorbidity scores ranged from CS 0 to CS 2, with CS 0 being the most frequent category in both groups; the complete distribution is presented in Table I.

The primary outcome was early pain score (VAS) at 24 hours post surgery. The median (IQR) score was 4.0 (3.0–4.0) in the laparoscopic group and 5.0 (5.0–6.0) in the open group ($p<0.001$). This depicts that

Table II: Comparison of early post operative pain (n=60)

Variable	Group A (Laparoscopic Surgery) (n=30)	Group B (Open Surgery) (n=30)	p- value
Pain score (VAS) at 24 hrs, [Median(IQR)]	4 (3.0-4.0)	5 (5.0- 6.0)	< 0.001

Table I: Comparison of baseline characteristics. (n=60)

Variable		Group A (Laparoscopic Surgery) (n=30)	Group B (Open Surgery) (n=30)	p- value
Age (years), mean $\pm$ SD		52.97 $\pm$ 10.34	47.50 $\pm$ 12.80	0.07
ASA Score	ASA I, n (%)	17 (56.6%)	19 (63.4%)	0.561
	ASA II, n (%)	12 (40%)	11 (36.6%)	
	ASA III, n (%)	1 (3.4%)	0 (0%)	
Comorbidity Score	CS 0, n (%)	21 (70%)	26 (86.7%)	0.187
	CS 1, n (%)	7 (23.4%)	4 (13.3%)	
	CS 2, n (%)	2 (6.6%)	0 (0%)	
Operative Time, min -Median (IQR)		46.5 (45.0-50.0)	31 (27.0-35.0)	< 0.005
Length of hospital stay, days - Median (IQR)		1 (1.0-2.0)	2.0 (2.0-3.0)	< 0.005

Table III: Comparison of surgical outcomes (n=60)						
Variable	Group A (Laparoscopic Surgery) (n=30)			Group B (Open Surgery) (n=30)		
Additional Post op analgesia use, n (%)	Yes	No		Yes	No	
	5 (16.67%)	25 (83.33%)		9 (30%)	21 (70%)	
Post op complication (up to 2 wks), n (%)	Infection	Seroma	None	Infection	Seroma	None
	0 (0%)	0 (0%)	30(100%)	1(3.33%)	0(0%)	29(96.67%)
						p- value
						0.561
						< 0.001

laparoscopic hernia surgery is associated with less pain in comparison to open hernia surgery. The secondary surgical outcomes include operative time, length of hospital stay, post operative analgesia use and post operative complications. Median (IQR) operative time was 46.5 min (45.0–50.0) in the laparoscopic group and 31.0 min (27.0–35.0) in the open group ($p < 0.005$). Median (IQR) post operative hospital stay was 1 day (1.0–2.0) in the laparoscopic group and 2.5 days (2.0–3.0) in the open group ($p < 0.005$). Thus, laparoscopic repair required a longer operative time but was associated with a shorter hospital stay.

Additional postoperative analgesia was used by 5 (16.67%) patients in the laparoscopic group and 9 (30.0%) patients in the open group. No postoperative complication occurred in the laparoscopic group, whereas 1 (3.33%) patient in the open group developed superficial surgical site infection. These findings are illustrated in Table III.

Discussion

In the present study, we compared laparoscopic hernia repair and open Lichtenstein repair for unilateral inguinal hernia in terms of postoperative pain. Our findings demonstrate that laparoscopic repair was associated with significantly lower early post operative pain scores at 24 hours compared to the open Lichtenstein repair. These findings align with contemporary international evidence suggesting that minimally invasive inguinal hernia repair offers superior short term pain outcomes.

A systematic review and metaanalysis of 21 RCTs by Haladu et al⁷ also suggests that laparoscopic hernia repair was associated with a less postoperative pain in comparison to open hernia repair. Similarly, a comparative RCT study published in India in 2025⁸ also reported that laparoscopic repair significantly improves short term pain outcomes and facilitates earlier return to daily activities by reducing the hospital stay.

In our study, operative time was significantly longer in the laparoscopic group. This observation aligns with the findings from a 2021 analysis in Turkey⁹ published in *Wideochir Inne Tech Maloinwazyjne*, demonstrated that minimally invasive inguinal hernia repair is associated with increased operative duration, particularly during the learning curve period. However, operative time

differences tend to diminish with increasing surgeon experience and institutional expertise.

The length of hospital stay in our laparoscopic cohort was slightly shorter compared with the open repair group. Similar findings were also reported by Perez et al.¹⁰

From a patient centered perspective, minimally invasive surgery has demonstrated improved satisfaction and faster return to normal activity. A 2025 prospective patient reported outcome study⁴ in *Updates in Surgery* showed significantly higher postoperative comfort and quality of life scores in patients undergoing laparoscopic inguinal hernia repair compared with open repair. Similar findings were also reported by various studies in Pakistan^{5,11} where patients in laparoscopic group had longer operative time, reduced hospital stay, early return to work and reduced postoperative pain.

Our study has several notable strengths. It addressed a clinically relevant outcome, inclusion of a homogenous study population, uniform analgesic protocol and local contextual contribution.

Despite these strengths, the study also has few limitations. The sample size, although adequate for the primary outcome, may still limit the detection of smaller differences in secondary parameters. Single centre study design restricts the external validity and generalizability to broader setups. Use of non-probability convenience sampling technique introduces potential selection bias. Although inguinal hernia is more common in males, complete absence of female patients restricts applicability across genders. Another drawback is that the pain perception is entirely subjective. Although VAS scale is validated, it may still be influenced by individual pain thresholds and psychological factors. Follow-up time being short and limited to 24 hours post-operatively, so longer term pain patterns and recovery outcomes could not be properly assessed. Finally, only elective procedures were included and the results may not apply to emergency cases or any complex alternative surgeries.

Conclusion

Laparoscopic unilateral inguinal hernia repair is associated with significantly reduced early postoperative pain compared to open Lichtenstein repair, despite longer operative times. These findings

support the feasibility and patient centered advantages of minimally invasive hernia repair in the local population,

highlighting its potential to improve early recovery and postoperative comfort.

References

1. HerniaSurge Group. International guidelines for groin hernia management. *Hernia*. 2018 Feb;22(1):1-165. doi: [10.1007/s10029-017-1668-x](https://doi.org/10.1007/s10029-017-1668-x).
2. Élthes EE, Dénes M, Neagoe MR, Dézsi-Benyovszki A. Influence of the learning curve on the immediate postoperative pain intensity after laparoscopic inguinal hernioplasty. *Med Pharm Rep*. 2023;96(3):283-8. doi: [10.15386/mpr-2525](https://doi.org/10.15386/mpr-2525).
3. Islam MS, Faizi SAM, Rahman MZ, Alam RJ, Hossain MJ, Miraj AKA. Laparoscopic versus open surgical outcomes repair for inguinal hernia – a combined prospective and retrospective cohort study. *Int J Med Res Rev*. 2024 Available from: <https://ijmrr.medresearch.in/index.php/ijmrr/article/view/1500>.
4. Khajuria S, Aayushi. Patient-reported outcomes following laparoscopic versus open inguinal hernia repair: a prospective comparative study. *Int Surg J*. 2025 Nov 26;12(12):2151-4. DOI:[10.18203/2349-2902.isj20253841](https://doi.org/10.18203/2349-2902.isj20253841)
5. Dal NA, Qureshi M, Memon S, Murtaza G, Sadiq CT, Azhar S. Postoperative outcomes and patient satisfaction following laparoscopic versus open inguinal hernia repair: a comparative study. *Pak J Med Health Sci*. 2023;17(10):67-70. DOI:[10.53350/pjmhs2023171067](https://doi.org/10.53350/pjmhs2023171067).
6. Garg R, Anantharaju GS, Basavarajappa M. Post-operative pain and recovery in laparoscopic vs open inguinal hernia repair: a randomized clinical trial. *Int J Med Pharm Res*. 2024;5(6):77-90.
7. Haladu N, Alabi A, Brazzelli M, Imamura M, Ahmed I, Ramsay G et al. Open versus laparoscopic repair of inguinal hernia: an overview of systematic reviews of randomised controlled trials. *Surg Endosc*. 2022 Jul;36(7):4685-4700. doi: [10.1007/s00464-022-09161-6](https://doi.org/10.1007/s00464-022-09161-6). Epub 2022 Mar 14.
8. Jain P, Kale R, Moudgil A. A comparative randomized control study between transabdominal preperitoneal (TAPP) repair and Lichtenstein repair of inguinal hernias in a tertiary care center in Delhi NCR. *IOSR J Dent Med Sci*. 2025;24(6):21-29. <https://doi.org/10.9790/0853-2406052129>
9. Goksoy B, Azamat IF, Yilmaz G, Sert OZ, Onur E. The learning curve of laparoscopic inguinal hernia repair: a comparison of three inexperienced surgeons. *Wideochir Inne Tech Maloinwazyjne*. 2021 Jun;16(2):336-346. doi: [10.5114/wiitm.2020.100831](https://doi.org/10.5114/wiitm.2020.100831).
10. Perez AJ, Strassle PD, Sadava EE, Gaber C, Schlottmann F. Nationwide Analysis of Inpatient Laparoscopic Versus Open Inguinal Hernia Repair. *J Laparoendosc Adv Surg Tech A*. 2020 Mar;30(3):292-298. doi: [10.1089/lap.2019.0656](https://doi.org/10.1089/lap.2019.0656).
11. Bux K, Bashir J, Khan IA, Bilal M, Kumar S, Khan RMA. Comparison between open Shouldice versus laparoscopic unilateral inguinal hernia repair: a randomized controlled trial. *Pak J Med Health Sci*. 2022;16(4):449. <https://doi.org/10.53350/pjmhs22164449>