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Patient-reported outcomes following laparoscopic versus open inguinal hernia repair: a prospective comparative study

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ABSTRACT

Background: Laparoscopic and open inguinal hernia repairs are widely performed surgical procedures. Patient-reported outcomes, including post-operative pain, quality of life (QOL), and return to work, are increasingly important measures of surgical success.

Methods: A prospective comparative study was conducted on 50 patients undergoing unilateral inguinal hernia repair—25 laparoscopic and 25 open. Pain was assessed using the Visual Analog Scale (VAS), QOL using the SF-36 questionnaire, and return to work in days. Data was analyzed using appropriate statistical methods.

Results: The laparoscopic group had significantly lower post-operative pain scores at 24 hours (mean VAS: 3.2 ± 0.8 versus 5.6 ± 1.1 , $p < 0.001$) and faster return to work (8 ± 2 days versus 15 ± 4 days, $p < 0.001$). QOL scores at 1 month post-operatively were higher in the laparoscopic group (SF-36 total score: 82 ± 6 versus 74 ± 7 , $p = 0.002$).

Conclusions: Laparoscopic inguinal hernia repair is associated with reduced post-operative pain, faster return to work, and improved early quality of life compared with open repair.

Keywords: Laparoscopic hernia repair, Open hernia repair, Quality of life, Post-operative pain, Patient-reported outcomes

INTRODUCTION

Inguinal hernia repair remains one of the most commonly performed surgical procedures worldwide, with millions of cases treated annually.¹ The primary objective of surgery is not only to restore the integrity of the abdominal wall but also to ensure optimal functional recovery, minimize post-operative morbidity, and improve overall quality of life. Over the past few decades, significant advances in surgical techniques have transformed the approach to inguinal hernia management, particularly with the introduction of minimally invasive methods.²

Traditionally, the open anterior mesh repair has been the gold standard due to its simplicity, cost-effectiveness, and reproducibility.³ However, it is associated with certain limitations, including higher rates of post-operative pain, wound-related complications, and delayed return to normal activity.⁴ In contrast, laparoscopic inguinal hernia

repair, introduced in the early 1990s, offers advantages such as smaller incisions, reduced post-operative discomfort, faster rehabilitation, and lower incidence of chronic groin pain.^{5,6} Despite these benefits, concerns remain regarding its technical complexity, longer learning curve, and higher procedural costs, which continue to influence surgical decision-making.⁷

While numerous studies have compared open and laparoscopic techniques in terms of recurrence rates and perioperative outcomes, there is growing recognition that patient-reported outcomes (PROs) provide a more comprehensive assessment of surgical success.⁸ Parameters such as physical function, post-operative pain, cosmetic satisfaction, and time to return to normal activities or work directly reflect the patient's perspective and quality of life after surgery. These outcomes are increasingly regarded as essential benchmarks for evaluating modern surgical interventions.⁹

Given the evolving focus on patient-centered care, it is imperative to systematically compare laparoscopic and open hernia repair beyond conventional surgical metrics.

This prospective comparative study was designed to evaluate patient-reported outcomes following laparoscopic versus open inguinal hernia repair, with emphasis on physical function, pain, and recovery, thereby contributing evidence to guide clinical decision-making and optimize patient care.

METHODS

Study design and population

A prospective comparative study was conducted between January 2024 and January 2025 at GMC Jammu. Fifty patients with unilateral inguinal hernia were enrolled and assigned to either laparoscopic repair (n=25) or open repair (n=25) based on surgeon and patient preference.

The study included patients between 18 and 65 years of age who had a primary unilateral inguinal hernia and were fit for surgery with ASA grade I-II. Patients with recurrent or bilateral hernias, complicated hernias such as strangulated or obstructed types, and those with severe comorbidities beyond ASA grade II were excluded from the study.

Surgical technique

All patients underwent surgery under standard aseptic precautions.

For the laparoscopic group, repair was performed using the transabdominal preperitoneal (TAPP) approach under general anesthesia. A three-port technique was used, with a 10 mm infraumbilical port for the camera and two 5 mm working ports placed in the lower abdomen. After creating a peritoneal flap, the hernia sac was reduced, and a polypropylene mesh of adequate size was placed in the preperitoneal space to cover the myopectineal orifice. The mesh was secured with tackers or sutures, and the peritoneal flap was closed to complete the procedure. For the open group, repair was carried out by the Lichtenstein tension-free mesh technique, performed under spinal anesthesia. A standard inguinal incision was made, and the hernia sac was dissected, reduced, or excised as appropriate.

A polypropylene mesh was then placed over the posterior wall of the inguinal canal and fixed to the pubic tubercle, inguinal ligament, and conjoint tendon with interrupted sutures, ensuring tension-free reinforcement. The external oblique aponeurosis and skin were closed in layers.

Outcome measures

Post-operative pain was assessed using the Visual Analogue Scale (VAS) at 24 hours, 48 hours, and 1 week

after surgery. Quality of life was evaluated with the Short Form-36 (SF-36) questionnaire at baseline (pre-operatively) and at 1 month post-operatively. Return to work was recorded as the time interval between surgery and the resumption of normal occupational activities.

Statistical analysis

Data were analyzed using SPSS v25. Continuous variables were expressed as mean \pm SD and compared using Student's t-test. Categorical variables were compared using Chi-square test. P<0.05 was considered statistically significant.

RESULTS

The average age of patients in the laparoscopic group was 45 years (± 12), while in the open group it was 47 years (± 11). The p-value (0.54) shows that the difference is not statistically significant, meaning the two groups were similar in terms of age.

In the laparoscopic group, there were 22 males and 3 females, while in the open group there were 21 males and 4 females. The p-value (0.68) indicates no significant difference, meaning both groups had a comparable male-to-female ratio.

Overall, the table demonstrates that both groups were well matched for age and gender, ensuring comparability before assessing outcomes.

Pain scores were consistently lower in the laparoscopic group compared to the open group at all time intervals. At 24 hours, the mean VAS score was 3.2 \pm 0.8 in the laparoscopic group versus 5.6 \pm 1.1 in the open group (p<0.001). At 48 hours, pain scores were 2.0 \pm 0.6 and 3.5 \pm 1.0, respectively (p<0.001). By 1 week, the scores had decreased further to 1.2 \pm 0.5 in the laparoscopic group and 2.1 \pm 0.7 in the open group (p=0.002).

These findings indicate that patients undergoing laparoscopic repair experienced significantly less postoperative pain compared to those who underwent open repair.

At 1 month postoperatively, patients in the laparoscopic group demonstrated significantly better quality-of-life outcomes compared to those in the open group. The Physical Function domain score was 85 \pm 5 in the laparoscopic group versus 78 \pm 6 in the open group (p=0.001). The Pain domain score was also higher in the laparoscopic group (88 \pm 7) compared to the open group (76 \pm 8, p=0.001). Similarly, the overall SF-36 score was significantly greater in the laparoscopic group (82 \pm 6) than in the open group (74 \pm 7, p=0.002).

Patients in the laparoscopic group returned to normal work activities significantly earlier than those in the open group,

with a mean duration of 8 ± 2 days compared to 15 ± 4 days in the open group ($p<0.001$).

Table 1: Patient demographics.

Parameters	Laparoscopic (n=25)	Open (n=25)	P value
Age (years)	45±12	47±11	0.54
Male:female	22:3	21:4	0.68

Table 2: Post-operative pain scores (VAS).

Time	Laparoscopic	Open	P value
24 h	3.2±0.8	5.6±1.1	<0.001
48 h	2.0±0.6	3.5±1.0	<0.001
1 week	1.2±0.5	2.1±0.7	0.002

Table 3: Quality of life (SF-36, 1 month).

Domain	Laparoscopic (n=25)	Open (n=25)	P value
Physical function	85±5	78±6	0.001
Pain	88±7	76±8	0.001
Overall score	82±6	74±7	0.002

Table 4: Return to work.

Return to work	Laparoscopic	Open	P value
	8±2 days	15±4 days	<0.001

DISCUSSION

In this study, we compared laparoscopic repair and open Lichtenstein repair for primary unilateral inguinal hernia in terms of postoperative pain, quality of life, and return to work. Our findings demonstrate clear advantages of laparoscopic repair over the open approach across multiple outcome measures. Postoperative pain was significantly lower in the laparoscopic group at 24 hrs, 48 hrs, and 1 week, as measured by the VAS. This is consistent with previous studies, which attribute reduced pain after laparoscopic repair to minimal tissue dissection, less handling of nerves, and avoidance of extensive skin and muscle incision compared to the open approach.^{4,5} Reduced pain also likely contributed to the improved early mobilization observed in these patients.

Quality of life, assessed using the SF-36 questionnaire at 1 month, was significantly higher in the laparoscopic group in the domains of physical function, pain, and overall score. These findings suggest that the minimally invasive nature of laparoscopic repair allows for faster recovery of daily activities and improved patient satisfaction.¹⁰ The reduced postoperative discomfort and 5. Eklund A, Montgomery A, Bergqvist L, Rudberg C. Chronic pain 5 years after randomized comparison of laparoscopic and Lichtenstein inguinal hernia repair. Quicker restoration of

physical function likely explain the higher quality-of-life scores in this group.^{1,3}

Return to work was markedly faster in the laparoscopic group, with patients resuming normal occupational activities nearly a week earlier than those undergoing open repair. This is an important functional outcome, particularly for working-age patients, and highlights the socioeconomic benefits of the laparoscopic approach.

Baseline characteristics such as age and sex distribution were comparable between the two groups, ensuring that the observed differences in outcomes are likely attributable to the surgical technique rather than patient factors.

Overall, our study supports the growing body of evidence that laparoscopic repair offers significant advantages in terms of postoperative pain, quality of life, and recovery time when compared to open Lichtenstein repair, while maintaining comparable safety and efficacy. These findings underscore the importance of considering patient-centered outcomes, particularly in populations where early return to normal activities is critical.

CONCLUSION

Laparoscopic repair for primary unilateral inguinal hernia provides significant advantages over open Lichtenstein repair, including reduced postoperative pain, faster recovery, improved quality of life, and earlier return to work. These findings suggest that, when feasible, laparoscopic repair should be considered the preferred approach, particularly for patients who prioritize a quicker functional recovery.

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