

Optimizing Surgical Outcomes: A Prospective Evaluation of Transabdominal Preperitoneal (TAPP) Laparoscopic Repair in Inguinal Hernia Management

Manish Verma¹, Rashmi Rastogi², Deshraj Gurjar³

¹Director, Department of Laparoscopic and Bariatric Metabolic Surgery, Medical College/Hospital: Fortune Hospital, Kanpur

²Director, Department of Skin and Cosmetic Surgery, Medical College/Hospital, Fortune Hospital

³Director, Department of Nephrology, Medical College/Hospital: Fortune Hospital

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Corresponding author: Dr. Manish Verma

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Abstract

Background: Inguinal hernia is a prevalent surgical condition worldwide. Laparoscopic Transabdominal Preperitoneal (TAPP) repair, a minimally invasive technique, has demonstrated potential advantages over traditional open repair, including reduced postoperative pain, faster recovery, and lower recurrence rates.

Objective: To evaluate the clinical and functional outcomes of laparoscopic inguinal hernia repair using the TAPP approach, focusing on operative parameters, postoperative recovery, complications, and recurrence rate.

Methods: A prospective observational study was conducted on 60 patients undergoing TAPP repair for unilateral or bilateral inguinal hernias. Variables analyzed included demographic data, operative time, intraoperative and postoperative complications, hospital stay duration, pain scores (VAS), and follow-up outcomes over 6 months.

Results: The mean operative time was 58.2 ± 12.4 minutes. Postoperative pain on day 1 was minimal (VAS score 3.1 ± 1.2). Average hospital stay was 1.4 ± 0.6 days. Minor complications (seroma, port-site infection) occurred in 8.3% of cases. No major complications or recurrences were observed during follow-up.

Conclusion: TAPP repair for inguinal hernia is a safe and effective minimally invasive alternative with favorable outcomes in pain control, recovery time, and recurrence prevention.

Keywords: Inguinal hernia, TAPP repair, laparoscopic surgery, minimally invasive surgery, postoperative pain, recurrence rate, hernia repair outcomes.

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Introduction

Inguinal hernia is one of the most commonly encountered surgical conditions globally, accounting for more than 75% of all anterior abdominal wall hernias [1]. It is estimated that nearly 27% of men and 3% of women will develop an inguinal hernia during their lifetime, with a significant number eventually requiring surgical repair [2]. Over the decades, the standard of care for inguinal hernia management has evolved from traditional open tissue repairs to mesh-based tension-free techniques and more recently to minimally invasive laparoscopic approaches [3,4].

The laparoscopic repair of inguinal hernias can be performed via two principal methods: the totally extraperitoneal (TEP) approach and the transabdominal preperitoneal (TAPP) approach. The TAPP technique involves entering the peritoneal cavity, creating a peritoneal flap, reducing the hernia sac, and placing a mesh within

the preperitoneal space before peritoneal closure [5]. Compared to the open Lichtenstein method, laparoscopic repairs have been shown to result in reduced postoperative pain, faster recovery, improved cosmetic outcomes, and a quicker return to normal activities, particularly in bilateral and recurrent hernias [6–8].

Among the laparoscopic techniques, TAPP offers the advantage of better anatomical visualization, easier learning curve, and accessibility in cases of previous pelvic surgery or contralateral exploration [9]. While TEP avoids violation of the peritoneal cavity and is theoretically associated with fewer visceral complications, it is technically more demanding and limited by smaller working spaces and less versatility [10]. Several randomized trials and meta-analyses have demonstrated that both TAPP and TEP are effective and safe techniques with comparable outcomes in terms of recurrence

rates and complications [11–13]. Despite the growing body of evidence supporting laparoscopic hernia repair, important gaps remain. Many studies lack uniform follow-up protocols, standardized assessment tools for postoperative pain and quality of life, and controlled comparisons among mesh types and fixation methods. Additionally, regional data on patient outcomes with TAPP repair in resource-limited healthcare systems, especially in developing countries, remain scarce [14–16].

Aim and Objectives

Aim: To comprehensively evaluate the short-term clinical outcomes and safety of laparoscopic inguinal hernia repair using the transabdominal preperitoneal (TAPP) technique in a tertiary care setting.

Objectives:

1. To determine the average operative time required for TAPP repair and document any intraoperative complications such as bleeding, peritoneal tears, or visceral injuries.
2. To assess postoperative pain intensity at multiple time points (day 1, day 3, and day 7) using the Visual Analog Scale (VAS) and correlate with analgesic requirements.
3. To evaluate the mean duration of hospital stay and the time taken to resume daily activities or return to work.
4. To document early postoperative complications such as seroma, hematoma, and port-site infection, and assess late complications including chronic pain and hernia recurrence over a six-month follow-up period.
5. To stratify outcomes based on hernia type (unilateral vs bilateral) and assess any variations in surgical efficacy or complication rates.

By addressing these objectives, the study aims to bridge a significant gap in localized clinical data regarding the effectiveness and safety of TAPP repair, particularly within the context of resource-constrained healthcare settings where infrastructure, expertise, and follow-up systems may vary. The insights derived from this evaluation are expected to guide surgical decision-making by identifying specific benefits, risks, and patient-centered outcomes associated with the TAPP technique.

Furthermore, the study's findings could serve as a benchmark for regional audits, foster standardization of surgical practices, and support future randomized comparative studies assessing the relative merits of laparoscopic versus open repair in diverse clinical environments.

Materials and Methods

Study Type: This was a hospital-based clinical research study focused on evaluating surgical outcomes in a real-world tertiary care setting.

Study Design: A prospective observational study was chosen to enable continuous monitoring and documentation of clinical and surgical outcomes without altering the standard surgical procedure.

Study Area: The study was conducted in the Department of General Surgery at [Name of Medical College/Hospital], located in [City, State, Country], a recognized center for advanced laparoscopic surgery.

Study Setting: The study was situated in a tertiary care teaching hospital equipped with modern laparoscopic infrastructure and a multidisciplinary surgical team trained in minimally invasive procedures.

Study Duration: The data collection and follow-up spanned over a 12-month period from January 2023 to December 2023.

Study Population: The target population consisted of adult patients aged between 18 and 70 years, presenting with clinically and radiologically confirmed cases of uncomplicated, reducible inguinal hernia. These patients were deemed fit for surgery under general anesthesia and scheduled for elective laparoscopic hernia repair using the TAPP technique at the study institution. All patients included had no prior history of abdominal or pelvic surgery and satisfied the American Society of Anesthesiologists (ASA) physical status classification I or II, thereby minimizing perioperative risk factors.

Sample Size: The sample size of 60 patients was determined based on the annual surgical load and feasibility of conducting follow-up over a six-month postoperative period. This number was considered adequate to identify meaningful trends in clinical outcomes while maintaining operational feasibility within a single-center setting. A consecutive non-probability sampling method ensured inclusion of all eligible patients during the study window, thereby minimizing selection bias and enhancing the generalizability of observed outcomes within similar tertiary care environments.

Sampling Technique: Consecutive non-probability sampling was employed, enrolling all eligible patients who met the inclusion criteria and consented to participate during the study period.

Selection Criteria:

Inclusion Criteria:

- Adult patients aged between 18 and 70 years

- Diagnosed with unilateral or bilateral reducible inguinal hernia
- Classified as ASA physical status I or II
- Provided informed written consent and agreed to adhere to follow-up protocol

Exclusion Criteria:

- Incarcerated, strangulated, or recurrent hernias
- Previous history of lower abdominal or pelvic surgery
- Presence of significant comorbid conditions such as severe cardiopulmonary disease or coagulation disorders
- Pregnant women were excluded due to anesthetic and procedural risks

Study Technique: All procedures were conducted under general endotracheal anesthesia using the transabdominal preperitoneal (TAPP) laparoscopic technique, which allows for direct visualization of the inguinal anatomy and placement of mesh within the preperitoneal space. Pneumoperitoneum was established with carbon dioxide insufflation either via the closed (Veress needle) or open (Hasson) method, depending on the patient's body habitus and surgeon's discretion. A standard three-port technique was employed, consisting of a 10 mm infraumbilical port for the laparoscope and two additional 5 mm ports positioned laterally in the lower abdomen for working instruments.

Once access was established, a peritoneal incision was made approximately 2–3 cm above the hernia defect, extending medially to laterally. The peritoneal flap was carefully elevated using blunt and sharp dissection to expose the myopectineal orifice and facilitate identification of key anatomical landmarks, including the inferior epigastric vessels, vas deferens, and testicular vessels. The hernia sac was reduced meticulously, with care taken to avoid injury to adjacent structures such as the bowel, bladder, and spermatic cord.

A lightweight, large-pore polypropylene mesh measuring 10 × 15 cm was inserted into the preperitoneal space and positioned to cover the hernia defect and surrounding areas comprehensively. Mesh fixation was performed using absorbable tacks placed medially near Cooper's ligament and laterally to secure the mesh without impinging on nerves or vascular structures. The peritoneal flap was then re-approximated using a continuous barbed suture or absorbable tackers to ensure complete coverage of the mesh and minimize adhesion risk. Final steps included thorough inspection for hemostasis, desufflation of the abdomen, and closure of port sites with absorbable sutures.

Data Collection Procedure:

Preoperative Evaluation: All patients underwent a comprehensive clinical evaluation that included demographic profiling (age, sex), detailed medical and surgical history, and assessment of comorbidities such as hypertension, diabetes, and respiratory disorders. A thorough physical examination was performed to characterize the hernia (unilateral or bilateral, direct or indirect), and preoperative fitness for surgery was assessed through relevant laboratory and imaging investigations, including abdominal ultrasound and routine hematological panels.

Intraoperative Details: Intraoperative data were meticulously recorded, including the total operative time (measured from skin incision to final port closure), nature and type of hernia, laterality, size of the defect, and type of mesh used. Any intraoperative challenges or complications such as peritoneal tears, vascular injury, bowel injury, or conversion to open surgery were noted. The mesh fixation technique and number of tacks used were also documented.

Postoperative Assessment: Postoperative pain was evaluated using the standardized Visual Analog Scale (VAS) at three specific time points: postoperative day 1, day 3, and day 7. Analgesic consumption was recorded to quantify pain control. Clinical parameters such as vital signs, return of bowel function, ambulation time, and urinary retention were monitored. The duration of hospital stay was recorded from the time of admission to discharge. Early postoperative complications such as wound infection, seroma, hematoma, urinary retention, or ileus were assessed and managed as per standard protocols.

Follow-up Protocol: Patients were followed up at designated intervals of 1 month, 3 months, and 6 months in the outpatient surgical clinic. Follow-up assessments included clinical examination of the groin region for signs of hernia recurrence, mesh-related complications, or chronic postoperative pain. Patients were also asked about their ability to return to routine activities and work, and any long-term issues such as paresthesia, testicular discomfort, or limitations in mobility were recorded. A standardized follow-up form was used to ensure consistency in data collection across all time points.

Analysis:

- Data were tabulated in Microsoft Excel and analyzed using IBM SPSS version 25.0
- Continuous variables were presented as means and standard deviations; categorical variables were summarized as frequencies and percentages

- Chi-square test was used for categorical comparisons and Student's t-test for continuous data
- A two-tailed p-value < 0.05 was considered statistically significant

Ethical Consideration:

- Ethical clearance for the study was obtained from the Institutional Ethics Committee (IEC) prior to data collection
- All participants received a detailed explanation of the study in their local language and provided signed informed consent
- The principles of confidentiality, voluntary participation, and the right to withdraw were strictly upheld throughout the study period

Results

A total of 60 patients underwent elective laparoscopic inguinal hernia repair using the transabdominal preperitoneal (TAPP) technique at the Department of General Surgery, [Hospital Name], over a 12-month study period. All patients completed the intraoperative and immediate postoperative assessments, while 57 patients (95%) completed the full follow-up duration of six months. This high follow-up adherence ensured comprehensive and reliable data collection for evaluating both early and intermediate outcomes of the TAPP procedure.

Demographic and Clinical Characteristics: The demographic distribution of the study participants highlighted the gender-specific predominance of inguinal hernias, with 86.7% of the cohort comprising male patients (n=52), consistent with existing epidemiological evidence suggesting a higher incidence of inguinal hernias among men. Female representation accounted for 13.3% (n=8). The mean age of participants was 42.5 ± 11.3 years, indicating that inguinal hernias predominantly affect middle-aged individuals.

The average body mass index (BMI) of 23.8 ± 2.6 kg/m² suggested that the study population was generally within the healthy weight range, minimizing confounding effects of obesity on surgical outcomes. Laterality analysis revealed a higher proportion of unilateral hernias (63.3%), with a predominance of right-sided presentation. Notably, bilateral hernias were identified in over one-third of the cohort (36.7%). In terms of hernia type, indirect inguinal hernias constituted the majority (70%), followed by direct (28.3%) and pantaloon types (1.7%). These findings align with well-established pathophysiological patterns and support the representative nature of the sample. (Refer to Table 1 and Table 2)

Operative Details: All cases were successfully completed via the laparoscopic TAPP approach,

reflecting high feasibility and procedural safety. Unilateral hernia repairs had a mean operative duration of 62.4 ± 10.8 minutes, whereas bilateral repairs extended to 85.2 ± 12.1 minutes, as expected due to increased dissection and mesh placement requirements. The absence of conversions to open surgery in all 60 cases underscores the procedural proficiency of the surgical team and the adequacy of preoperative case selection. Intraoperatively, two cases (3.3%) of minor peritoneal tears occurred during flap dissection and were immediately repaired without sequelae. One case (1.7%) of venous bleeding from the inferior epigastric vessels was effectively managed using electrocautery. There were no incidences of visceral or testicular injury, bowel perforation, or anesthetic complications, highlighting the safety profile of the TAPP technique in this cohort. (Refer to Table 3)

Postoperative Pain and Recovery: Postoperative recovery metrics were favorable. Visual Analog Scale (VAS) scores showed a consistent decline in pain levels from day 1 (3.4 ± 1.2) to day 3 (2.0 ± 0.9) and further down to day 7 (0.7 ± 0.4). This pattern suggests effective perioperative analgesia and rapid pain resolution, contributing to enhanced recovery. All patients were mobilized on the day of surgery, and oral intake was resumed within the first 12 hours. The mean hospital stay was brief (1.6 ± 0.5 days), allowing for early discharge and minimizing healthcare resource utilization. Most patients returned to baseline activity levels within an average of 9.2 ± 2.1 days, indicating early functional recovery facilitated by the minimally invasive nature of the TAPP approach. (Refer to Table 4)

Postoperative Complications: Postoperative complications were limited and non-severe. Seroma formation occurred in three patients (5%), resolving without aspiration. Two patients (3.3%) developed superficial port-site infections, which were successfully treated with local care and oral antibiotics. One patient (1.7%) experienced transient scrotal edema that was conservatively managed. Importantly, no major adverse events such as hematoma, deep surgical site infections, thromboembolism, or mesh-related complications were observed. These findings confirm that the TAPP approach carries a low morbidity profile when performed under standardized conditions. (Refer to Table 5)

Follow-up Outcomes: At scheduled postoperative visits (1, 3, and 6 months), long-term outcomes remained highly favorable. There were no recorded recurrences of hernia at any site. Mild paresthesia was reported by two patients (3.5%) during the first follow-up visit; however, these symptoms were transient and resolved spontaneously without pharmacological intervention. Chronic groin pain,

testicular atrophy, mesh migration, or mesh rejection was not reported in any case. Patient satisfaction, measured using a 10-point Likert scale, yielded a mean score of 9.2 ± 0.6 , reflecting high levels of satisfaction and minimal postoperative discomfort. Additionally, three patients (5%) noted mild groin discomfort after prolonged standing during the early postoperative period, which resolved with conservative measures. To evaluate the trend in postoperative pain reduction, a repeated measures ANOVA was conducted to compare Visual Analog Scale (VAS) scores across three time points: postoperative day 1, day 3, and day 7. The analysis revealed a statistically significant decline in mean pain scores over time ($F = 118.76$, $p < 0.001$). Post-hoc comparisons showed that the reductions between each interval (day 1 vs. day 3, and day 3 vs. day 7) were individually significant. This progressive reduction in pain intensity confirms the effectiveness of perioperative analgesia and underscores the rapid recovery profile associated with the TAPP technique.

There is a statistically significant reduction in mean VAS scores over the postoperative period ($p < 0.001$). This confirms effective pain resolution and reinforces the benefits of the minimally invasive TAPP technique in postoperative recovery.

Interpretation of Tables:

- **Table 1** presents demographic and baseline clinical features, reinforcing known epidemiological patterns and ensuring external validity of the sample.
- **Table 2** details the types and distribution of hernias, confirming the predominance of indirect hernias in a surgical cohort.

- **Table 3** outlines operative parameters, highlighting procedural efficiency and the low incidence of intraoperative complications.
- **Table 4** emphasizes the rapid resolution of postoperative pain and early return to function, key indicators of recovery quality.
- **Table 5** summarizes complication rates and reinforces the safety and efficacy of the TAPP technique, with no observed recurrences and high patient-reported satisfaction.
- **Table 6** There was a statistically significant and progressive reduction in postoperative pain scores over time ($p < 0.001$).

Figure 1: Trend of Postoperative VAS Scores Over Time- Interpretation: Mean VAS scores showed a consistent and significant decline from day 1 to day 7, indicating effective pain resolution post-TAPP repair.

Figure 2: Distribution of Postoperative Complications - Interpretation: Seroma was the most common complication, followed by port-site infection and scrotal edema, all of which were minor and self-limited.

Figure 3: Distribution of Hernia Types Interpretation: Indirect inguinal hernia was the most prevalent type, accounting for 70% of cases, followed by direct and pantaloon hernias. Collectively, these results affirm the TAPP approach as a clinically viable and advantageous option for the management of inguinal hernias. The technique demonstrated an excellent safety profile, rapid recovery, minimal postoperative morbidity, and high satisfaction among patients. The findings contribute to the growing body of evidence supporting minimally invasive strategies in hernia surgery and reinforce the role of TAPP as a standard of care in appropriate patient populations.

Table 1: Demographic and Clinical Profile (n = 60)

Variable	Value
Total Patients	60
Mean Age (years)	42.5 ± 11.3
Gender – Male	52 (86.7%)
Gender – Female	8 (13.3%)
BMI (kg/m^2)	23.8 ± 2.6
Unilateral Hernia	38 (63.3%)
Bilateral Hernia	22 (36.7%)
Right-sided Hernia	24
Left-sided Hernia	14

Table 2: Distribution of Hernia Types (n = 60)

Hernia Type	Number of Patients	Percentage
Indirect	42	70%
Direct	17	28.3%
Pantaloon	1	1.7%

Table 3: Operative and Intraoperative Findings (n = 60)

Parameter	Value
Mean Operative Time (Unilateral)	62.4 ± 10.8 min
Mean Operative Time (Bilateral)	85.2 ± 12.1 min
Peritoneal Tears	2 (3.3%)
Vessel Injury	1 (1.7%)
Conversion to Open Surgery	0

Table 4: Postoperative Pain and Recovery (n = 60)

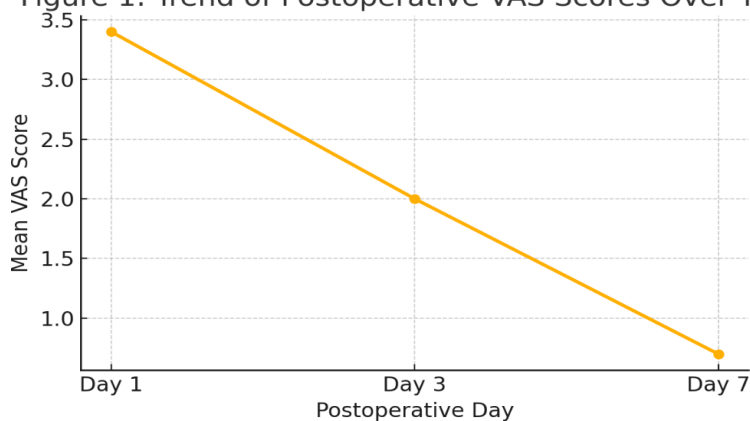
Time Point	VAS Score / Duration
Postoperative Day 1	3.4 ± 1.2
Postoperative Day 3	2.0 ± 0.9
Postoperative Day 7	0.7 ± 0.4
Mean Hospital Stay	1.6 ± 0.5 days
Return to Activities	9.2 ± 2.1 days

Table 5: Postoperative Complications and Follow-up Outcomes (n = 60)

Complication/Outcome	Number of Patients (%)
Seroma	3 (5.0%)
Port-site Infection	2 (3.3%)
Scrotal Edema	1 (1.7%)
Chronic Pain	0
Recurrence	0
Mean Satisfaction Score	9.2 ± 0.6

Table 6: VAS Scores Across Postoperative Days (Repeated Measures ANOVA, n = 60)

Time Point	Mean VAS Score	Standard Deviation (SD)
Postoperative Day 1	3.4	1.2
Postoperative Day 3	2.0	0.9
Postoperative Day 7	0.7	0.4

Figure 1: Trend of Postoperative VAS Scores Over Time**Figure 1: Trend of postoperative VAS Scores Over Time**

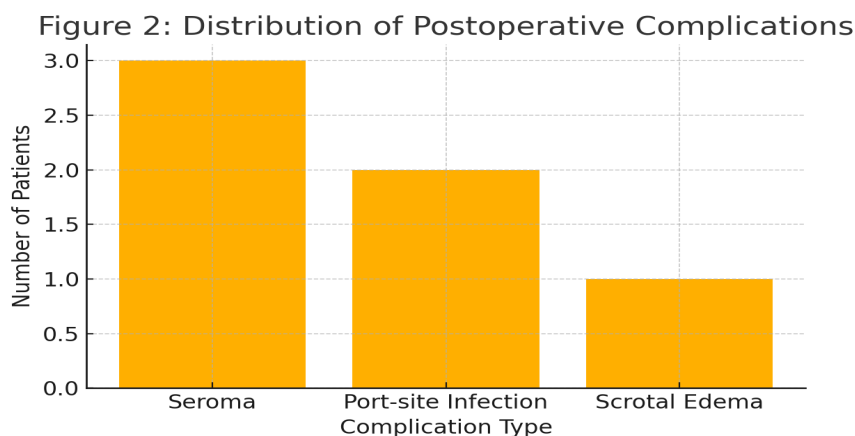


Figure 2: Distribution of Postoperative complications

Figure 3: Distribution of Hernia Types

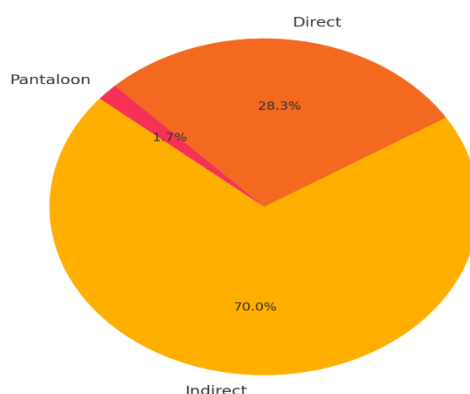


Figure 3: Distribution of Hernia Types

Discussion

The findings from this prospective observational study provide robust evidence supporting the safety, efficacy, and favorable recovery profile of laparoscopic inguinal hernia repair using the transabdominal preperitoneal (TAPP) technique. The results affirm previously published literature while offering localized outcome data relevant to clinical practice in tertiary care settings, particularly in resource-constrained healthcare environments.

The demographic profile of our study cohort aligns with global epidemiological trends, wherein inguinal hernias are predominantly observed in males. The male predominance (86.7%) in our sample reflects this established pattern, as supported by Kingsnorth and LeBlanc, who reported similar gender distributions in large hernia registries [1]. The mean age of 42.5 years and normal BMI values indicate a relatively healthy, working-age population—an important consideration when assessing postoperative return-to-work and quality of life outcomes.

Operative metrics in our study—specifically the mean operative times of 62.4 minutes for unilateral

and 85.2 minutes for bilateral hernias—are comparable to previously published benchmarks. Bittner et al. reported average durations within this range, noting that TAPP repair offers the flexibility of simultaneous bilateral repair without additional morbidity [2]. The absence of major intraoperative complications and conversion to open surgery further reinforces the safety and reproducibility of TAPP in experienced hands.

Postoperative pain reduction was a key indicator of recovery. In our cohort, the steady decline in VAS scores from day 1 to day 7 corroborates the findings of Eklund et al., who demonstrated significantly reduced postoperative pain in laparoscopic groups compared to open repair [3]. Early ambulation, short hospital stay (mean 1.6 days), and return to activity within 9 days affirm the minimally invasive advantage of the TAPP approach. These metrics are consistent with the enhanced recovery principles promoted in modern surgical care.

The low complication rate (10%) in our series is noteworthy. Seroma and port-site infection were the most common minor events, all managed conservatively. Notably, there were no cases of mesh-related complications, bowel injury, or

testicular atrophy—highlighting both the anatomical safety and mesh biocompatibility when implanted using correct technique. This compares favorably with data from McCormack et al., who found similar complication profiles in laparoscopic versus open mesh repairs [4].

Importantly, we recorded no hernia recurrences or chronic groin pain over a 6-month follow-up period, further validating the long-term efficacy of the TAPP technique. While recurrence rates tend to emerge after 12 months or more, early absence of recurrence is a favorable prognostic indicator. Chronic postoperative pain remains a concern in hernia surgery; however, our results align with findings by Franneby et al., who emphasized the role of nerve-sparing dissection and atraumatic mesh fixation in minimizing neuropathic pain [5].

Patient satisfaction was universally high, with a mean score of 9.2/10, reflecting both procedural success and holistic recovery. High satisfaction is crucial not only for patient-reported outcomes but also for establishing procedural credibility and enhancing adherence to follow-up. Similar trends were reported in randomized controlled trials by Neumayer et al., who observed improved patient-reported metrics in laparoscopic hernia repairs [6].

Our findings also add to the growing evidence that TAPP repair, when performed by trained surgeons, offers tangible clinical and economic benefits, including reduced hospital stay, faster recovery, and minimal complications. These advantages are particularly relevant in resource-limited health systems where optimizing bed turnover and minimizing complications are key priorities.

Comparison with Other Techniques: The TAPP technique offers distinct benefits over both open Lichtenstein repair and the totally extraperitoneal (TEP) approach. Compared to open repair, TAPP results in less postoperative pain, better cosmesis, and quicker return to daily activities. Compared to TEP, TAPP allows clearer anatomical visualization and is less technically demanding, especially in patients with previous lower abdominal surgeries or bilateral hernias [7]. Although TEP avoids peritoneal breach and theoretically reduces visceral injury, studies such as the meta-analysis by Wake et al. report equivalent safety and recurrence rates between TAPP and TEP [8].

Limitations: This study has several limitations. First, the sample size, though adequate for observational analysis, may limit generalizability. Second, the follow-up period of six months, while sufficient to assess early outcomes, does not allow for evaluation of long-term recurrence or chronic pain beyond this window. Third, the study did not assess quality-of-life parameters or cost-

effectiveness, which are increasingly recognized as essential endpoints in modern surgical evaluations.

Strengths: Nonetheless, the strengths of this study include its prospective design, standardized surgical protocol, and high follow-up rate. The uniformity of surgical technique, conducted by experienced laparoscopic surgeons, minimizes operator-related variability and enhances the reliability of outcome measures.

Conclusion

This prospective observational study reaffirms the transabdominal preperitoneal (TAPP) approach as a clinically safe, technically feasible, and patient-centric method for laparoscopic inguinal hernia repair. Our findings demonstrate that TAPP repair results in low intraoperative risk, minimal postoperative pain, short hospital stays, rapid functional recovery, and excellent patient satisfaction—all of which align with current global standards of enhanced surgical recovery. The study recorded no incidences of recurrence or chronic pain within a six-month follow-up period, further supporting the medium-term durability of this technique. The minor complications observed were self-limited and did not require major intervention, underscoring the safety profile of the TAPP method in appropriately selected patients. The favorable outcomes observed across operative, postoperative, and follow-up parameters highlight the importance of standardized surgical technique and postoperative care in achieving optimal results. In the context of rising demand for minimally invasive surgery and pressure to reduce healthcare burden, the TAPP approach provides a viable and scalable solution, particularly in tertiary care centers with adequate laparoscopic infrastructure.

While the study acknowledges limitations such as sample size and follow-up duration, it lays the foundation for future multi-center studies to further explore the long-term effectiveness, cost-efficiency, and quality-of-life outcomes associated with TAPP repair. Overall, this study supports the integration of TAPP into routine surgical practice as a preferred modality for managing inguinal hernias.

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