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Transabdominal Preperitoneal vs Totally Extraperitoneal for Repairing Inguinal Hernia: A Comparative Study of Short-Term Outcomes

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Abstract

Inguinal hernia repair ranks among the most frequently performed surgical operations globally, offering a range of different methods for addressing the condition. Among these, the Transabdominal Preperitoneal (TAPP) and Totally Extraperitoneal (eTEP) methods stand out as minimally invasive options. These techniques have become increasingly preferred for their benefits compared to the conventional open hernia repair approach. This study aims to compare the short-term outcomes of TAPP and eTEP techniques in inguinal hernia repair. This comparative study within the General Surgery Departments of Shaheed Suhrawardy Medical College & Hospital (ShSMCH) and Mugda Medical College & Hospital during July 2022 to June 2023. Fifty patients were selected via purposive sampling, adhering to specific inclusion and exclusion criteria for inguinal hernia repair, and were subsequently divided into two equal groups. The first group of twenty-five patients received treatment through the TAPP technique, while the second group of twenty-five underwent repair using the eTEP method. The assignment to each technique was carried out using a random lottery system. The investigation focused on short-term outcomes such as operative duration, post-surgery pain levels, hospitalization length, immediate complications, and rates of hernia recurrence. Statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-20). The average duration of surgery for the TAPP technique was recorded at 99.4±9.1 minutes, compared to 94.4±9.9 minutes for the TEP method, with no statistically significant difference observed between the two. Regarding postoperative pain, measured using the Visual Analogue Scale (VAS), TAPP patients reported significantly lower pain scores at all post-surgery intervals: 3.58±0.53 (6 hours), 3.50±0.76 (12 hours), 3.08±0.53 (24 hours), and 3.01±0.15 (48 hours), whereas TEP patients experienced higher scores of 5.57±0.53 (6 hours), 6.35±0.92 (12 hours), 4.82±0.71 (24 hours), and 3.71±0.31 (48 hours), indicating significantly ($p<0.001$) less pain for those in the TAPP group at every measured time point. The TAPP group also benefited from a shorter mean hospital stay of 3.1±0.8 days versus 3.8±0.9 days for the TEP group, highlighting the TAPP technique's efficiency in facilitating quicker postoperative recovery. This study highlights the short-term benefits of TAPP over eTEP in inguinal hernia repair, particularly in terms of length of hospital stay, pain and duration of surgery. However, further research with larger sample sizes and longer follow-up periods is warranted to validate these findings and guide clinical decision-making.

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Introduction

An inguinal hernia is a condition characterized by the protrusion of abdominal cavity contents through the inguinal canal. This common surgical issue is especially prevalent among males and can result from increased abdominal pressure, leading to the bulging of intestines or fat through weak points in the abdominal wall. The diagnosis and management of this condition have evolved, with minimally invasive techniques such as the Transabdominal Preperitoneal (TAPP) and Totally Extraperitoneal (eTEP) methods becoming preferred due to their advantages in reducing recovery times and post-operative discomfort (Philip *et al*., 2023).

In a recent systematic review and meta-analysis of population-based study Abebe *et al*. found that the overall prevalence of inguinal hernia stood at 7.7% with a 95% confidence interval ranging from 6.06% to 9.34% (Abebe *et al*., 2022). Through subgroup analysis, they discovered that Asia had the highest prevalence at 12.72%, whereas America had the lowest at 4.73%. Additionally, the prevalence among males significantly exceeded that of females, being 9.61% (95% CI: 6.46–12.76) for males compared to only 1.31% (95% CI: 0.36–2.26) for females.

Risk factors for inguinal hernia include the physiological and anatomical vulnerabilities associated with the condition. Surgical interventions, particularly those involving mesh and non-mesh repairs, play a significant role in the postoperative outcomes of inguinal hernia treatment (Sakamoto *et al*., 2022). Clinical and hernia-specific factors also significantly influence the cost and management strategies for inguinal hernia repair, highlighting the importance of tailored surgical approaches (Aydin *et al*., 2021). Innovative surgical techniques, such as minimally invasive approaches, have been shown to reduce postoperative pain, chronic pain, hematoma, and wound infection, offering a significant advantage over traditional Lichtenstein tension-free repair (Aiolfi *et al*., 2021). Additionally, pediatric inguinal hernia management requires a customized approach, considering the unique anatomical and physiological aspects of children to optimize surgical outcomes and reduce the risk of complications (Morini *et al*., 2022). Nonpharmacologic therapies, like transcutaneous electrical acupoint stimulation, have been explored for their potential to reduce analgesic requirements postoperatively, further illustrating the multifaceted approach needed in managing inguinal hernias (Szmit *et al*., 2021).

The pathology of inguinal hernia primarily involves the protrusion of abdominal viscera through a weakened area in the inguinal region of the abdominal wall. This condition can be classified into congenital hernias, stemming from the failure of the peritoneovaginal canal to close, and acquired hernias, associated with the deterioration of the inguinal region's muscular and fascial structures. The necessity for surgical intervention arises due to the significant risks associated with the condition's progression, with techniques such as the Shouldice and Lichtenstein methods being prevalent in treatment approaches (Hajri *et al*., 2023).

Inguinal hernia repair, a common surgical intervention, is not without potential complications affecting morbidity rates. Factors like cardiovascular disease have been identified as significant risk factors for both early and late morbidity post-repair, necessitating tailored approaches for patients with such underlying conditions (Hajili *et al.*, 2023). Moreover, accidental bladder injuries during repair, though preventable, can significantly heighten morbidity, emphasizing the need for careful operative planning and preoperative diagnostic measures to mitigate risks (Soumey *et al*., 2022).

The transabdominal preperitoneal (TAPP) technique for inguinal hernia repair is acknowledged for its minimal invasiveness, facilitating reduced postoperative pain, shorter recovery times, and early discharge from hospital compared to traditional methods. This approach avoids opening the peritoneum, thereby minimizing the risk of injury to abdominal organs (Lomnicki *et al*., 2018). Robotic-assisted TAPP surgeries have shown to be technically feasible, with a relatively short learning curve for surgeons experienced in laparoscopic procedures, indicating a promising step towards mastering other robot-assisted operations (Choi *et al*., 2023). Moreover, TAPP is highlighted for its effectiveness in both genders, demonstrating

particular advantages in female patients with groin hernias (Lin *et al*., 2023). Collectively, these insights underscore the TAPP technique's significance in the contemporary surgical management of inguinal hernias, embodying a blend of efficiency, safety, and patient-centric outcomes.

The totally extraperitoneal (TEP) technique for inguinal hernia repair represents a pivotal advancement in minimally invasive surgery. Distinguished by its approach that avoids the peritoneal cavity, TEP minimizes the risk of intra-abdominal organ injury and facilitates a quicker recovery and less postoperative discomfort for patients. The technique has evolved to incorporate technologies such as artificial intelligence for enhancing surgical workflow recognition, thereby increasing the precision and safety of hernia repairs (Ortenzi *et al*., 2023). Comparative studies have underscored TEP's advantages, including shorter operative times and lower postoperative pain, thus underscoring its efficacy and patient-centric outcomes in inguinal hernia management (Chu *et al*., 2023). Through continuous innovation and validation, TEP stands as a testament to the evolution of hernia surgery towards optimal patient outcomes.

While extensive research has been conducted on the long-term effects of both TAPP and eTEP hernia repair methods, there's a noticeable lack of focus on their short-term outcomes. These include metrics such as the duration of surgery, the intensity of post-surgical pain, hospital stay length, immediate complications, and early recurrence rates, all of which are vital for evaluating surgical success and enhancing patient satisfaction. The necessity to understand how TAPP and eTEP differ in these short-term outcomes is pivotal for both surgeons and patients to make more informed choices.

This research is designed to bridge this knowledge gap by offering a detailed comparison of the short-term results following TAPP and eTEP procedures for inguinal hernia repair. It will assess critical aspects such as surgery time, postoperative pain, hospitalization duration, initial complications, and rates of recurrence early post-surgery. The objective is to enrich the current academic discourse with significant insights into the efficiency and safety of these minimally invasive surgical options. The outcomes of this investigation are expected not just to augment existing literature but also to refine clinical methodologies, thereby enhancing the recuperative experience of patients with inguinal hernias. In essence, this investigation targets a crucial, yet under explored, aspect of hernia surgery by comparing the immediate results of TAPP and eTEP surgeries. Its findings aim to influence surgical choices, improve patient management strategies, and ultimately, ameliorate the postoperative quality of life for patients treated for inguinal hernias.

Materials and Methods

This randomised comparative study was conducted within the General Surgery Department of Shaheed Suhrawardy Medical College & Hospital (ShSMCH) and Mugda Medical College & Hospital during July 2022 to June 2023. Fifty patients, chosen through purposive sampling according to specific inclusion and exclusion criteria for inguinal hernia repair, were divided into two groups. Twenty-five of these patients were treated using the Transabdominal Preperitoneal (TAPP) technique, while the remaining twenty-five underwent the Totally Extraperitoneal (eTEP) approach, with the allocation determined by a lottery system.

Inclusion criteria for the study

1. Adult Patients Requiring Surgery
2. Types of Hernias
   - Direct Hernias
   - Indirect Hernias
3. ASA Grade 1 and 2 Patients
4. Informed Consent

Exclusion criteria for the ctudy

1. Patients Under 12 Years
2. Patients Not Fit for General Anesthesia
3. Patients Not Providing Consent for Laparoscopic Surgery
4. Recurrent Hernias
5. Bilateral Hernias
6. Emergency Surgeries
7. Incomplete Medical Records

Sample Size (n)

To calculate sample size for case control study the comparison between two means, the following formula was followed[16]

$$n = \frac{(Z_\alpha + Z_\beta)^2 \times (\sigma_1^{\ 2} + \sigma_2^{\ 2})}{(\mu_1 - \mu_2)^2}$$

Here,

μ_1 = 4.5 (mean values of pain score at 1 d in TEP)

μ_2 = 5.7 (mean values of pain score at 1 d in TAPP)

σ_1 = 0.9 (Standard deviation of TEP group)

σ_2 = 1.4 (Standard deviation of TAPP group)

Z_α = Z value (two tail) of standard normal distribution at 95% confidence level or 5% level of significance = 1.96 (when α = 0.05 at 5% level of significance)

Z_β = Z value (one tail) at 95% power = 1.64 (when β = 0.05 and Power = 1-β)

Therefore,

$$n = \frac{(1.96+1.64)^2 \times \{(0.90)^2 + (1.40)^2\}}{(4.5-5.7)^2} = 24.9$$

Sample size = 25 (each group).

Therefore, total sample size was 50 (25×2).

The diagnosis of an inguinal hernia was established through a detailed patient history and clinical examination. Prior to any procedure, the patient was subjected to a comprehensive set of standard tests, including a complete blood count, fasting and postprandial blood sugar levels, liver and kidney function tests, routine urine analysis and microscopy, screenings for HIV, HBsAg, and HCV, prothrombin time/international normalized ratio (PT/INR), an electrocardiogram (ECG), a chest X-ray in the posteroanterior (PA) view, and an ultrasound of the whole abdomen, with particular attention to post-void residual volume in elderly males. A thorough pre-anesthesia evaluation was conducted to ensure the patient's fitness for surgery. Following these preparatory steps, informed and written consent for the procedure was obtained from the patient.

Surgical technique

The decision to perform either TAPP or eTEP was based on surgeon preference and patient characteristics. TAPP involved creating a peritoneal flap through an intra-abdominal approach, while eTEP accessed the pre peritoneal space without entering the peritoneal cavity. All surgeries were performed by experienced surgeons specialized in hernia repair.

Outcome measures

The primary outcome measures included operative time, postoperative pain scores, length of hospital stay, early complications (defined as complications occurring within 30 days postoperatively), and hernia recurrence rates during the short-term follow-up period (defined as up to 6 months postoperatively).

Data analysis

Descriptive statistics were used to summarize patient demographics and baseline characteristics. Continuous variables were presented as mean ± standard deviation or median (interquartile range), depending on the distribution of the data. Categorical variables were presented as frequencies and percentages. Comparative analysis between the TAPP and eTEP groups was performed using independent t-tests or Mann-Whitney U tests for continuous variables and chi-square tests or Fisher's exact tests for categorical variables, as appropriate.

Ethical considerations

This study was conducted in accordance with the principles of the Declaration of Helsinki and approved by the institutional review board. Informed consent was obtained from all patients included in the study.

Results

This study involved the enrollment of 50 patients who met the specified inclusion and exclusion criteria. Subsequently, these patients were allocated into two distinct groups, each receiving a different treatment modality. The baseline characteristics between the TAPP and TEP groups show no significant

differences, indicating that the comparative analysis of short-term outcomes is based on well-matched subjects. This foundation allows for an unbiased assessment of the relative efficacy and safety of TAPP vs. TEP techniques in the repair of inguinal hernias (Table 1). The distribution of co-morbid conditions between the two surgical groups suggests slight variations in patient characteristics regarding hypertension and diabetes. However, the proportions of patients with hypertension, diabetes, both conditions, or no comorbidities do not show significant disparities, indicating a relatively comparable health profile of patients selected for either surgical method (Table 2).

Table 1 presents (baseline characteristics of patients undergoing inguinal hernia repair, comparing Transabdominal Preperitoneal (TAPP) and Totally Extraperitoneal (TEP) techniques. Age distribution across categories (<30, 30-40, 41-50, 51-60 years) shows a similar spread between the two groups, with mean ages of 42.8 years (TAPP) and 44.1 years (TEP), indicating no significant age-related difference (p=0.684). The sex distribution also did not differ significantly between groups, with a higher percentage of males (80% for TAPP and 72% for TEP; p=0.507). Body Mass Index (BMI) averages were close (23.6 for TAPP and 22.9 for TEP) with no statistical significance (p=0.480).

Table 2. Distribution of the study patients by Co-morbid illness (n=50)

Comorbid illness	TAPP (n=25)		TEP (n=25)	
	N	%	N	%
Hypertension	3	12.0	4	16.0
Diabetes	4	16.0	5	20.0
Hypertension with DM	4	16.0	4	16.0
No Comorbidities	14	56.0	12	48.0

Table 2 presents: Transabdominal Preperitoneal (TAPP) and Totally Extraperitoneal (TEP). In the TAPP group, 3(12.0%) of patients had hypertension, 4(16.0%) had diabetes, 4(16.0%) had both hypertension and diabetes, and 14(56.0%) had no comorbidities. Comparatively, in the TEP group,

Table 1. Baseline Characteristics of Study Population (n=50)

Baseline Characteristics	TAPP (n=25)		TEP (n=25)		P value
	N	%	N	%	
Age (years)					
<30	4	16.0	2	8.0	
30 – 40	5	20.0	7	28.0	
41 – 50	9	36.0	8	32.0	
51 – 60	7	28.0	8	32.0	
Mean±SD	42.8±11.2		44.1±10.7		[a]0.684[ns]
Median (IQR)	44(33-53)		44(36-54)		
Range (min-max)	18-59		19-60		
Sex					
Male	20	80.0	18	72.0	[b]0.507[ns]
Female	5	20.0	7	28.0	
BMI					
Mean±SD	23.6±2.25		22.9±1.92		[a]0.480[ns]
Range(min,max)	20.1, 26.5		19.8, 25.9		

ns= not significant; [a]p value reached from unpaired t-test; [b]p value reached from Chi-square test

4(16.0%) of patients had hypertension, 5(20.0%) had diabetes, 4(16.0%) had both hypertension and diabetes, and 48% had no comorbidities.

Table 3. Comparison of duration of surgery between TAPP and TEP (n=50)

Duration of surgery (min)	TAPP (n=25)	TEP (n=25)	P value
Mean±SD	87.0±7.5	94.4±9.9	0.005[s]
Median (IQR)	88(84-90)	95(86-104)	
Range (min-max)	80-100	75-110	

s = significant; p value reached from unpaired t-test

Table 3 presents a comparison of operation times for inguinal hernia repair using the Transabdominal Preperitoneal (TAPP) and Totally Extraperitoneal (TEP) methods. It was found that the TAPP technique had a marginally shorter average duration, recorded at 87.0±7.5 minutes, in contrast to the TEP's 94.4±9.9 minutes. This variance in time was determined to be statistically significant (p<0.005).

Table 4. Distributions of the study subject by VAS score (n=25)

Postoperative Pain during	TAPP (n=25)	TEP (n=25)	p value
	Mean±SD	Mean±SD	
6 hours after surgery	3.58±0.53	5.57±0.53	0.001[s]
12 hours after surgery	3.50±0.76	6.35±0.92	0.001[s]
24 hours after surgery	3.08±0.53	4.82±0.71	0.001[s]
48 hours after surgery	3.01±0.15	3.71±0.31	0.001[s]

s = significant; P value reached from Unpaired-t test

Table 4 presents a comparison of postoperative pain, measured using the Visual Analog Scale (VAS), at various time intervals after TAPP and TEP inguinal hernia repairs. The results indicate significantly lower pain scores for the TAPP group at all measured time points, with statistical significance (p=0.001) at each interval. The most substantial differences were

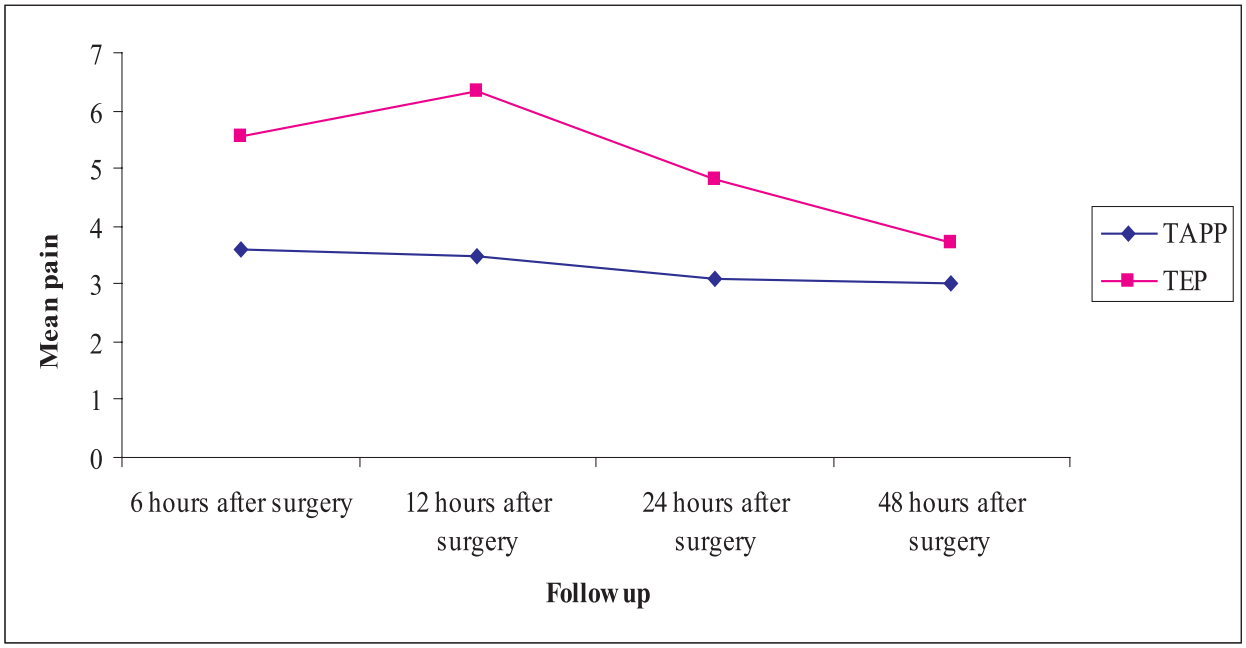

Figure 1. Line chart showing distribution of the study subject by VAS score

observed 12 hours post-surgery, where the TAPP group reported lower mean pain scores (3.50±0.76) compared to the TEP group (6.35±0.92). This trend of lower pain scores in the TAPP group persisted through 48 hours post-surgery, suggesting that TAPP might be associated with better short-term postoperative pain management compared to TEP.

Table 5. Distributions of the study subject by length of hospital stay (n=25)

	TAPP (n=25)	TEP (n=25)	p value
	Mean±SD	Mean±SD	
Length of Hospital Stay	3.1±0.8	3.8±0.9	0.005[s]
Range (min. max)	2, 4	2, 5	

s = significant; P value reached from Unpaired-t test

Table observed the analysis of hospital stay durations for patients undergoing inguinal hernia repair via the Transabdominal Preperitoneal (TAPP) versus Totally Extraperitoneal (TEP) techniques shows a significant difference between the two groups. Patients treated with TAPP had a shorter average hospital stay of 3.1 days, compared to 3.8 days for those treated with TEP, with the difference being statistically significant (p=0.005).

The statistical interpretation of Table 6, focusing on early complications within 30 days post-surgery for patients undergoing Transabdominal Preperitoneal (TAPP) vs Totally Extraperitoneal (TEP) inguinal hernia repairs, reveals that the overall incidence of early postoperative complications was low for both surgical techniques. However, there was a higher occurrence of haematomas in the TEP group (20%) compared to the TAPP group (4%),

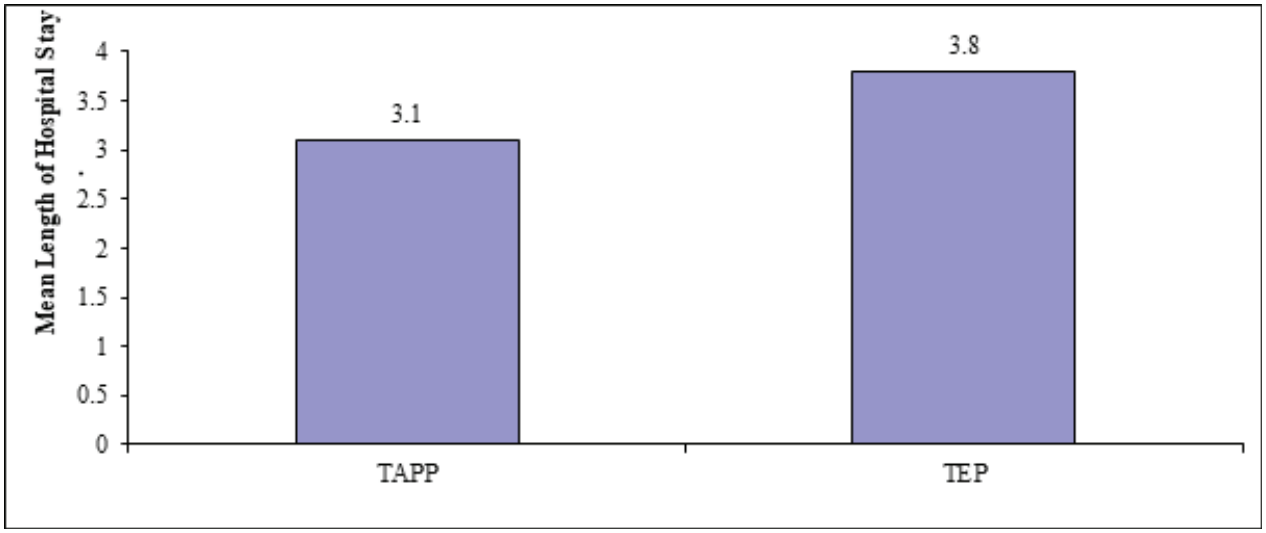

Figure 2. Bar-diagram showing distribution of the study subject by length of hospital stay

Table 6. Distribution of the study patients by early complications within 30 days (n=50)

Early Complications	TAPP (n=25)		TEP (n=25)		P value
	N	%	N	%	
Haematoma					
Present	2	4.0	5	20.0	0.208[ns]
Absent	23	96.0	20	80.0	
Seroma					
Present	0	0.0	1	4.0	0.500[ns]
Absent	25	100.0	24	96.0	

Scrotal oedema					
Present	0	0.0	1	4.0	0.500[ns]
Absent	25	100.0	24	96.0	
Port site hernia					
Present	0	0.0	1	4.0	0.500[ns]
Absent	25	100.0	24	96.0	
Wound and mesh infection					
Present	0	0.0	1	4.0	0.500[ns]
Absent	25	100.0	24	96.0	
Shoulder tip pain					
Present	0	0.0	0	0.0	-
Absent	25	100.0	25	100.0	

ns = not significant; p value reached from Fisher's exact test

although this difference did not reach statistical significance (p=0.208). Similarly, the incidences of seroma, scrotal oedema, port site hernia, and wound and mesh infection were slightly higher in the TEP group, each recorded at 4%, compared to none in the TAPP group. Yet, these differences were also not statistically significant (p=0.500 for each comparison), and shoulder tip pain was absent in both groups.

Table 7. Distribution of the study patients by recurrence (n=50)

Recurrence	TAPP (n=25)		TEP (n=25)	
	N	%	N	%
3rd POD				
Present	0	0.0	0	0.0
Absent	25	100.0	25	100.0
10th POD				
Present	0	0.0	0	0.0
Absent	25	100.0	25	100.0
1st month				
Present	0	0.0	0	0
Absent	25	100.0	25	100.0
3rd month				
Present	0	0.0	0	0.0
Absent	25	100.0	25	100.0
6th month				
Present	0	0.0	0	0.0
Absent	25	100.0	25	100.0

Table 7 shows recurrence of the study patients, it was observed that no patients had recurrence in TAPP and TEP respectively.

Discussion

The Transabdominal Preperitoneal (TAPP) approach for repairing inguinal hernias is favored for its efficient outcomes, including shorter hospital stays, reduced pain intensity, and quicker surgical procedures. By minimizing the patient's discomfort and recovery time, TAPP not only enhances the surgical experience but also significantly cuts down on healthcare costs and resource utilization. Its minimally invasive nature contributes to these benefits, allowing patients to resume their daily activities more swiftly than traditional methods. The TAPP technique represents a significant advancement in hernia repair, prioritizing patient well-being and operational efficiency.

This study revealed a close mean age between the TAPP (42.8±11.2 years) and TEP (44.1±10.7 years) groups, indicating that age does not significantly influence the choice between these surgical techniques for inguinal hernia repair. This finding is in line with Verheij *et al.*, suggesting a general agreement on the age range for patients undergoing these procedures. However, contrastingly, Hidalgo *et al.*, Rodha *et al.*, and Kockerling *et al.*, studies noted a preference or requirement for specific techniques in older populations, potentially due to the complexity of the hernia or previous surgeries. Such disparities might reflect geographic or demographic differences, emphasizing that patient-specific factors beyond age, including the hernia's complexity and surgical history, could influence the technique selection.

Recent studies on inguinal hernia repair indicate a significant male predominance, with 80% undergoing TAPP and 72% TEP surgeries. This trend doesn't suggest a bias in surgical technique selection based on sex, as these differences weren't statistically significant. Male predominance in this context is consistent with existing literature, highlighting anatomical and physiological predispositions in men, such as the inguinal canal, which is a potential herniation site. Studies by Verheij *et al.*, Husain *et al.,* and Wang *et al.* further support these observations, underscoring the commonality of inguinal hernias in males due to factors like the inguinal canal's presence, which increases herniation risk.

This comparative study found that the average Body Mass Index (BMI) for patients was relatively low and similar between the two groups (23.6±2.25 kg/m^2 for TAPP and 22.9±1.925 kg/m^2 for TEP), with no significant ($p>0.05$) statistical difference. Chinn *et al.* observed that higher BMIs were associated with longer operative times and increased post-surgical complications in robotic hernia repairs. Similarly, Mwagiru and Larkin highlighted BMI's impact on analgesic requirements and hospital stay durations post-surgery. Our study's deviation from these findings could be attributed to our patient relatively normal BMI ranges, suggesting that within this BMI spectrum, the choice between TAPP and TEP techniques does not significantly impact short-term surgical outcomes. This highlights the importance of considering patient-specific factors, such as BMI, in the selection of surgical techniques for inguinal hernia repair.

The present study analysis of co-morbid illnesses in patients undergoing inguinal hernia repair through TAPP and TEP techniques revealed an interesting distribution. In the TAPP group, comorbidities such as hypertension and diabetes were present in approximately 32% of patients, with 56% having no comorbid conditions. Conversely, the TEP group showed a slightly higher prevalence of these conditions, affecting 36% of patients, while 48% were without any comorbidities. Dokania *et al.*, Hidalgo *et al.,* and Rodha *et al*. studies suggest that comorbidities like hypertension and diabetes can complicate post-operative recovery, potentially leading to longer hospital stays and increased risk of complications. However, this study indicates that despite the presence of these comorbidities, a substantial proportion of patients in both groups had no comorbid conditions, which might contribute to the selection of surgical technique based on individual patient health profiles rather than a one-size-fits-all approach. The study finding aligns with the broader narrative within the field that emphasizes the need for personalized care in surgical decisions. This analysis contributes to our understanding of how comorbid illnesses are distributed among patients undergoing TAPP and

TEP surgeries, providing insights into the complex decision-making process for inguinal hernia repair.

Regarding the analysis on operation times for inguinal hernia repair, showing a statistically significant shorter duration for the TAPP method 87.0±7.5 minutes compared to TEP 94.4±9.9 minutes, complements findings from the wider surgical community. Dokania *et al.* similarly reported a shorter surgery duration for TAPP, with a median of 85 minutes, against 90 minutes for TEP, which was statistically significant. This aligns with Bittner *et al.*, who also found TEP's duration to exceed that of TAPP. The variance in operation times between TAPP and TEP could be attributed to the different procedural complexities. TAPP, despite its slightly shorter duration in our study, involves entering the peritoneal cavity, which might intuitively suggest a longer procedure time due to the need for additional steps such as peritoneal flap creation. Conversely, TEP avoids the peritoneal cavity, potentially simplifying the procedure but requiring more skill to navigate the preperitoneal space, which could explain the longer durations reported.

This study delves into the efficacy of TAPP versus TEP techniques in managing postoperative pain following inguinal hernia repair, revealing that TAPP consistently results in significantly lower pain scores post-surgery. These findings align with Rodha *et al*., which also highlighted TAPP's superiority in short-term pain relief compared to TEP. Particularly, lower median VAS scores at 6 hours, 24 hours, and the seventh day post-operation with TAPP suggest a smoother initial recovery phase. This trend highlights TAPP's potential to better mitigate immediate postoperative pain due to its procedural attributes. Although the studies noted converging pain scores between the techniques three months post-operation, indicating similar long-term pain management, the lack of chronic groin pain in either group underscores both methods' effectiveness and safety. Such insights are vital for enhancing patient care, guiding surgical choices, and managing postoperative expectations effectively.

Laparoscopic hernia repair, being minimally invasive, has lessened the length of postoperative hospitalization, thereby alleviating financial strain on both patients and healthcare facilities compared to traditional open hernia repair methods. The present study indicated a statistically significant difference in hospital stay durations between patients undergoing TAPP and TEP techniques for inguinal hernia repair, with TAPP patients experiencing a shorter average stay 3.1±0.8 days compared to TEP 3.8±0.9 days. Sharma *et al.,* and Rodha *et al*., both of which reported no significant difference in hospital stays between TAPP and TEP for bilateral inguinal hernia repairs, suggesting comparable efficiency in postoperative recovery between the two methods.[28,20] The discrepancy in this study findings might be attributed to the variations in procedural execution, patient selection, or postoperative care protocols, which could influence recovery speed and, subsequently, hospital stay duration.

This comparative effectiveness of Transabdominal Preperitoneal (TAPP) and Totally Extraperitoneal (TEP) approaches for inguinal hernia repairs in terms of short-term outcomes, this study aligns with the broader academic narrative, emphasizing the low overall incidence of early postoperative complications across both surgical techniques. Specifically, the observed disparities, such as a higher incidence of haematomas in the TEP group compared to the TAPP group, did not achieve statistical significance, mirroring the findings from other research in this domain. The study by Goksoy *et al*., which also explored similar terrains regarding complication rates between TAPP and TEP groups, found comparable outcomes, reinforcing the notion that both techniques are viable options with minimal early postoperative complications. The slight variances in complication rates, notably in haematomas and seromas, can be attributed to the inherent differences in surgical approaches and patient profiles. These observations suggest that while certain types of complications may be slightly more prevalent in one technique over the other, these differences are not statistically significant and do not detract from the overall safety and efficacy of either procedure.

In the comparative analysis for inguinal hernia repairs, this study reports a notable absence of recurrence within a 6-month follow-up period

for both TAPP and TEP groups. This finding is particularly significant as it underscores the efficacy of both surgical techniques in providing durable outcomes in the short term. Echoing the present study observations, the study conducted by Surati *et al.* also reported no recurrence in their examination of similar surgical techniques. The congruence between these findings not only reinforces the reliability of TAPP and TEP procedures in preventing the recurrence of inguinal hernias but also highlights the consistent surgical success across different study and settings. The similarity in outcomes between our study and that of Surati *et al.* suggests that, when executed with precision, both TAPP and TEP techniques are capable of achieving optimal patient outcomes with minimal risk of recurrence in the immediate months following surgery. This parallel in findings may be indicative of the advanced methodologies and stringent procedural standards employed in contemporary inguinal hernia repair surgeries, contributing to the overall improvement in patient care and postoperative recovery.

Conclusions

Overall, within the one-year study period, comprising 50 cases evenly distributed between TAPP and TEP techniques, TAPP demonstrated advantages in terms of lower postoperative pain scores, less duration of surgery and shorter length of hospital stay compared to TEP. Operative time, early complication rates, and recurrence rates were similar between the two groups.

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Declaration

The authors do not have any conflict of interest to declare.

Author's Contributions

Md Mustafizur Rahman: Conception and design, Analysis and interpretation of the data, Critical revision, editing and finalization of manuscript.

Afroza Kutubi: Data collection, validation and drafting of manuscript.

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