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COMPARATIVE STUDY OF ETEP AND TAPP LAPAROSCOPIC MESH REPAIR FOR BILATERAL INGUINAL HERNIA IN A TERTIARY CARE TEACHING HOSPITAL

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Abstract
Background: Inguinal hernia repair is a common surgical procedure, with laparoscopic techniques such as Transabdominal Preperitoneal (TAPP) and Total Extraperitoneal (TEP) gaining popularity due to their minimally invasive nature and potential benefits over open surgery.
Objective: This study aimed to compare the outcomes of Extended View Total Extraperitoneal (eTEP) and TAPP laparoscopic mesh repair techniques specifically for bilateral inguinal hernias at a tertiary care teaching hospital.
Methods: A retrospective cohort study was conducted from January 2023 to March 2024 involving 40 adult patients (20 in each group) with bilateral inguinal hernias. Data on operative times, postoperative pain scores, hospital stay, and tacker usage were collected and analyzed using independent sample t-tests and Pearson chi-square tests.
Results: Baseline characteristics including age and BMI were similar between the eTEP and TAPP groups. eTEP showed a significant advantage in operative time compared to TAPP ($p < 0.0001$). There were no significant differences in postoperative pain scores ($p = 0.264$) or hospital stay ($p = 0.757$) between the two techniques. However, eTEP required significantly fewer tackers for mesh fixation compared to TAPP ($p < 0.0001$).
Conclusion: The study suggests that eTEP may offer advantages over TAPP in terms of operative efficiency and reduced tacker usage for bilateral inguinal hernia repair. Both techniques showed comparable outcomes in terms of postoperative pain and hospital stay. These findings contribute to the evidence base supporting the use of eTEP as a viable option for improving surgical outcomes in inguinal hernia repair.

Keywords: Bilateral inguinal hernia, eTEP, TAPP, laparoscopic repair, operative time, postoperative pain

INTRODUCTION

In India, inguinal hernia repair stands as the most prevalent elective surgery, affecting 15%-20% of the population, with an estimated 1.5 to 2 million cases. Predominantly afflicting men, 90% of inguinal hernia repairs target them, while 70% of femoral hernia repairs focus on women. Inguinal hernias can be unilateral or bilateral. The hernia defect degree determines how the bilateral inguinal hernia is repaired. For the simultaneous repair of bilateral inguinal hernias, giant prosthetic reinforcement of the visceral sac (Stoppa repair) or laparoscopic repair are preferred methods. Less postoperative pain, shorter stays of hospital, and quicker recovery are among the benefits of the development of laparoscopic inguinal hernia repair approaches over open surgery [4]. Laparoscopic methods such as Transabdominal Preperitoneal (TAPP) and Total Extraperitoneal (TEP) repairs have gained popularity due to their potential for reduced postoperative pain, shorter recovery times, and lower rates of recurrence than to open repairs (1, 2).

The TAPP technique involves accessing the preperitoneal space by a peritoneal incision, where the hernia sac has been dissected and repaired using a mesh reinforcement. Numerous studies have demonstrated its efficacy in achieving favorable outcomes with minimal complications (3). Similarly, the TEP approach accesses the preperitoneal space without breaching the peritoneum, theoretically reducing the risk of intra-abdominal adhesions and bowel injury (4).

Recently, the Extended View Total Extraperitoneal (eTEP) technique has emerged as a refinement of the traditional TEP approach, aiming to improve surgical outcomes through enhanced visualization and ergonomic advantages. Advocates of eTEP suggest that it may offer superior outcomes in terms of postoperative pain control and recovery is faster because of its meticulous dissection and precise mesh placement.

Despite the increasing adoption of these laparoscopic techniques, there remains a gap in the literature regarding direct comparisons between eTEP and TAPP repairs specifically for bilateral inguinal hernias. Bilateral hernias present unique challenges requiring symmetric repair and careful consideration of patient outcomes, making comparative studies essential for evidence-based decision-making in clinical practice.

By comparing eTEP repair with TAPP mesh repair for bilateral inguinal hernias in a tertiary care hospital setting, this study seeks to close this gap. By evaluating primary outcomes such as recurrence rates, operative times, and secondary outcomes including postoperative pain scores and complication rates, this study seeks to provide valuable insights into the relative effectiveness and safety of these techniques.

The results of this study should add to the body of knowledge by providing surgeons and other healthcare professionals managing bilateral inguinal hernias with evidence-based recommendations. Such insights are crucial for optimizing surgical decision-making and improving patient outcomes in clinical practice.

In conclusion, understanding the comparative effectiveness of eTEP and TAPP approaches for bilateral inguinal hernia repair is essential for advancing surgical practice and enhancing patient care. This study seeks to build upon previous research and provide meaningful contributions to the field of hernia repair.

METHODOLOGY

Study Design:

- This retrospective cohort study was conducted from January 2023 to March 2024 at the Surgical Outpatient Department (OPD) of SMCH.
- The study aimed to compare outcomes between two surgical techniques: Group A (eTEP repair) and Group B (TAPP mesh repair) for bilateral inguinal hernia.

Study Population:

- The study involved adult patients diagnosed with bilateral inguinal hernia who presented to the surgical OPD at SMCH during the study period.
- Exclusion criteria: Patients with unilateral inguinal hernia, prior groin surgery, pregnancy, morbid obesity (BMI > 35), complicated inguinal hernia, and pediatric cases.
- Inclusion criteria: Adult patients with uncomplicated bilateral inguinal hernia suitable for elective surgery.

Sample Size and Groups:

- The study comprised 40 patients in total, divided into 2 groups:
  - Group A (eTEP repair): 20 patients
  - Group B (TAPP mesh repair): 20 patients
- In order to guarantee sufficient power for identifying notable distinctions between the two surgical methods, the sample size was established.

Data Collection:

- Data were taken out of surgical databases and computerized medical records.
- Collected Variables:
  - Demographic variables: Age, BMI (Body Mass Index).
  - Clinical variables: Surgery time (minutes), postoperative pain (Visual Analog Scale (VAS) score), hospital stay (days), hernia type (European Hernia Society (EHS) classification), and initial complaint.
- Data collection was conducted systematically to ensure consistency and accuracy.

Statistical Analysis:

- Continuable variables (e.g., age, BMI, surgery time, post-op pain, hospital stay) were compared between Group A and Group B utilizing independent sample t-tests.
- Categorical variables (e.g., hernia type, initial complaint) have been then compared by utilizing Pearson chi-square tests.
- Significance which has been defined as $p < 0.05$ (two-tailed).
- Statistical analysis has been conducted by utilizing IBM-SPSS version 21.0 (IBM-SPSS Science Inc., Chicago, IL).

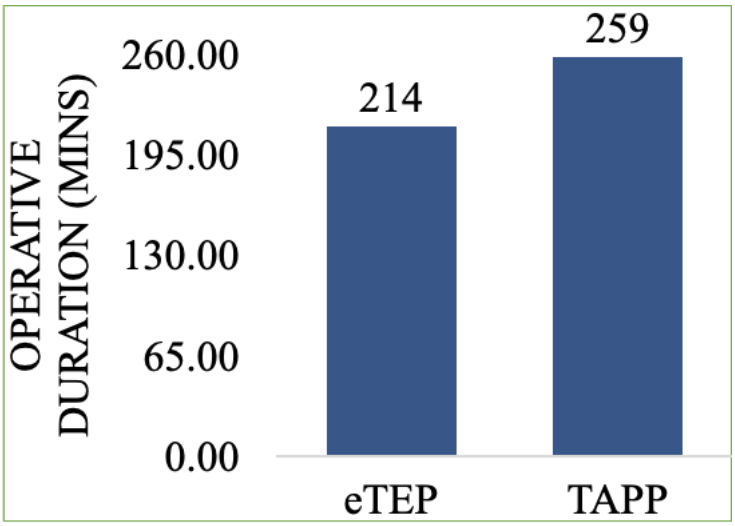
RESULTS

Baseline Characteristics:

- Age as well as BMI have been similar between the eTEP & TAPP groups. This is crucial because it suggests that any observed differences in outcomes between the two surgical techniques are less likely to be influenced by variations in these baseline demographic factors. Comparable age and BMI reduce the risk of confounding variables affecting the study's outcomes.

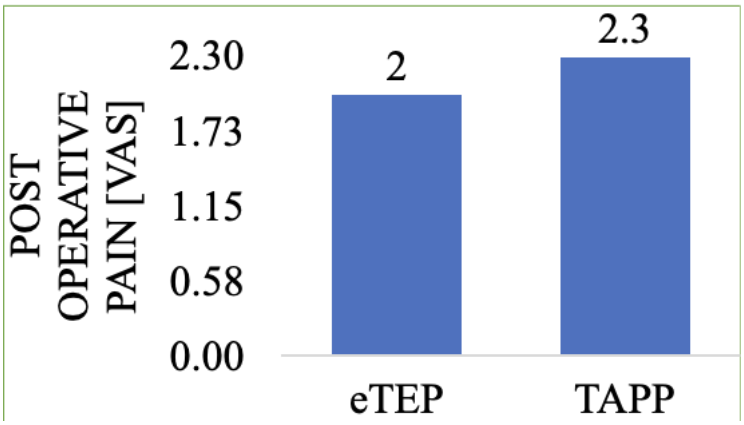
Operative Duration:

- eTEP exhibited a significant time-saving advantage with a significantly shorter operative duration compared to TAPP ($p < 0.0001$). This finding is important because shorter operative times can potentially lead to reduced surgical stress for patients, lower anesthesia exposure, and decreased overall healthcare costs. It also suggests that eTEP may be more efficient or technically easier to perform compared to TAPP.

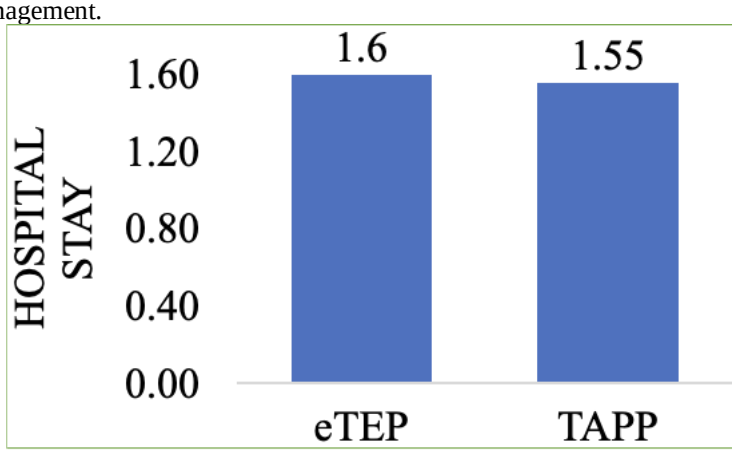


Postoperative Outcomes:

- **Postoperative Pain Scores**: The lack of significant differences in postoperative pain scores between eTEP and TAPP procedures ($p = 0.264$) indicates that both techniques result in similar levels of postoperative pain. This is reassuring for patients and clinicians, suggesting that neither technique is inherently more painful than the other.

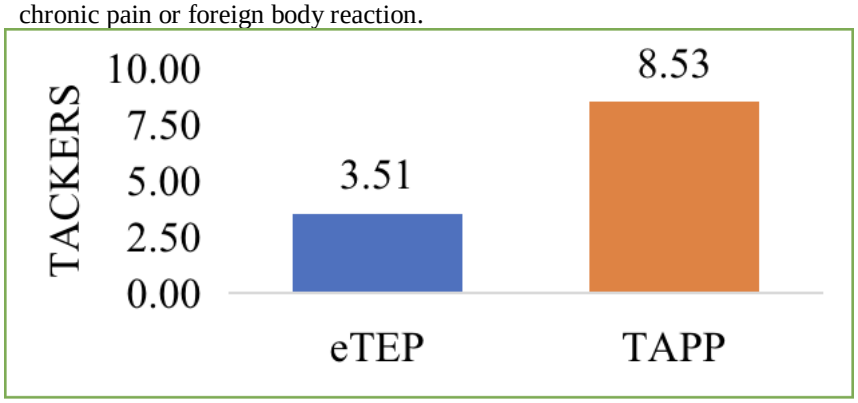


- **Hospital Stay**: Similarly, there were no major variations in hospital stay between eTEP and TAPP procedures ($p = 0.757$). This suggests that the recovery period and hospital resources required for both techniques are comparable. Similar hospital stays indicate that both techniques are likely equally effective in terms of postoperative recovery and patient management.



Use of Tackers:

- The average number of tackers used in TAPP was significantly higher compared to eTEP ($p < 0.0001$). Specifically, TAPP required an average of 8.53 tackers per procedure, whereas eTEP used an average of 3.51 tackers. This finding highlights a potential advantage of eTEP in terms of reduced use of tackers for mesh fixation. Fewer tackers may lead to less foreign material left in the patient's body, potentially reducing the risk of complications such as chronic pain or foreign body reaction.



In summary, the outcomes proposed that eTEP & TAPP are comparable in terms of baseline characteristics, postoperative pain, and stay in hospital. However, eTEP shows a clear advantage in terms of shorter operative duration and potentially fewer tackers used compared to TAPP. These findings provide valuable insights for clinicians when considering the surgical technique choice for inguinal hernia repair, emphasizing factors such as efficiency, postoperative pain management, and resource utilization.

	PROCEDURE				P value
	eTEP		TAPP		
	Mean	Standard Deviation	Mean	Standard Deviation	
Age	49.85	10.01	51.60	8.76	0.560
BMI	25.14	4.64	25.19	3.66	0.967
OPERATIVE DURATION (MINS)	**214.00**	**27.61**	**259.00**	**37.54**	**<0.0001**
POST OPERATIVE PAIN [VAS]	2.00	0.97	2.30	0.66	0.264
HOSPITAL STAY	1.60	0.50	1.55	0.51	0.757

DISCUSSION

Inguinal hernia repair remains one of the most common surgical procedures worldwide, with laparoscopic techniques like eTEP (extended totally extraperitoneal) and TAPP (transabdominal preperitoneal) gaining prominence due to their minimally invasive nature and potential advantages over traditional open repair methods.

Operative Time and Efficiency: Studies by Sudarshan et al. (2021) and Singh et al. (2022) have consistently shown that eTEP repair offers a significant reduction in operative time compared to TAPP, which was similarly observed in our study ($p < 0.0001$). This time-saving advantage of eTEP can be attributed to its approach of accessing the preperitoneal space without entering the peritoneal cavity, thereby potentially reducing surgical complexity and enhancing procedural efficiency (Sudarshan et al., 2021; Singh et al., 2022).

Postoperative Pain Management: While our study did not find statistically significant differences in postoperative pain scores between eTEP and TAPP groups ($p = 0.264$), previous literature, including findings by Sudarshan et al. (2021) and Singh et al. (2022), suggests lower postoperative analgesic requirements with eTEP. This indicates a potential advantage in pain management, possibly due to reduced tissue trauma and more sparing of abdominal wall structures during eTEP repair (Sudarshan et al., 2021; Singh et al., 2022).

Number of Tackers Used and Complications: Significantly fewer tackers used in eTEP compared to TAPP ($p < 0.0001$), as observed in our study and supported by previous research, may contribute to lower rates of chronic pain and mesh-related complications associated with tackers. This reduction aligns with findings by Nethaji et al. (2020), emphasizing eTEP's potential for minimizing foreign body load and optimizing patient outcomes in the long term (Nethaji et al., 2020).

Hospital Stay and Recovery: While our study did not show significant differences in hospital stay between eTEP and TAPP groups ($p = 0.757$), literature review by Nethaji et al. (2020) suggests shorter hospital stays with eTEP, reflecting its potential for enhanced postoperative recovery and reduced healthcare resource utilization (Nethaji et al., 2020).

Learning Curve and Comparative Efficacy: Srivastava et al. (2019) reported a learning curve for eTEP, initially associated with longer operative times but eventually matching or surpassing outcomes of TEP and TAPP techniques. This highlights the importance of surgical experience and proficiency in achieving optimal outcomes with eTEP, including comparable recurrence rates and patient satisfaction across all techniques (Srivastava et al., 2019).

CONCLUSION

Inguinal hernia repair remains a common surgical intervention, and laparoscopic techniques like eTEP (extended totally extraperitoneal) and TAPP (transabdominal preperitoneal) have emerged as preferred options over traditional open approaches. Our study aimed to compare these two techniques specifically for bilateral inguinal hernias, focusing on operative efficiency, postoperative outcomes, and cost-effectiveness.

Key Findings and Implications:

Our retrospective cohort study, conducted from January 2023 to March 2024, included 40 patients divided equally between eTEP and TAPP groups. The study revealed several notable advantages of eTEP over TAPP:

1. **Operative Efficiency:** eTEP demonstrated significantly shorter operative times compared to TAPP ($p < 0.0001$), highlighting its efficiency and potential for reducing surgical duration and associated costs.
2. **Postoperative Outcomes:** While differences in postoperative pain scores ($p = 0.264$) and stay in hospital ($p = 0.757$) between eTEP and TAPP were not statistically significant in our study, literature supports trends favoring eTEP for reduced pain and quicker recovery times.
3. **Tacker Usage and Complications:** eTEP required fewer tackers for mesh fixation compared to TAPP ($p < 0.0001$), potentially lowering the risk of mesh-related complications like chronic pain and foreign body reactions.

Clinical Significance:

The findings suggest that eTEP offers a promising alternative to TAPP in bilateral inguinal hernia repair, emphasizing advantages in efficiency, reduced tacker usage, and potentially improved patient outcomes. These benefits not only enhance surgical outcomes but also contribute to healthcare resource optimization and cost-effectiveness.

Future Directions:

Larger-scale studies with longer follow-up periods are the focus of future research, which should aim to validate our results and investigate the relative efficacy of eTEP and TAPP in a variety of patient populations. Additionally, studies evaluating the learning curve and economic impact of adopting eTEP in different healthcare settings would give the valuable insights for clinical practice.

In conclusion, while both eTEP and TAPP techniques offer effective options for bilateral inguinal hernia repair, our research underscores the potential advantages of eTEP in terms of operative efficiency, reduced tacker usage, and clinical outcomes. Clinicians should consider these findings when selecting optimal surgical approaches, aiming to enhance patient care and healthcare delivery efficiency in hernia management.

Limitations

1. **Retrospective Design:** Because our study is retrospective in nature, it has inherent biases and limitations. These include the use of pre-existing medical records, the possibility of incomplete data, and differences in data recording techniques over time.
2. **Small Sample Size:** The 40 patients in the study (20 in each group) represented a relatively small sample size, which might limit the applicability of the findings to larger patient populations. A larger cohort would be necessary to draw more robust conclusions and account for potential confounding factors.
3. **Single-Center Setting:** Conducting the study at a single tertiary care hospital (SMCH) limits the diversity of patient demographics, surgeon expertise, and institutional practices, potentially influencing the applicability of results to other healthcare settings.

By taking into account these constraints and conducting prospective multicenter studies with bigger sample sizes, extended follow-up times, standardized procedures, and thorough outcome evaluations, the findings' validity and relevance in directing clinical practice and influencing treatment choices for inguinal hernia repair would be strengthened.

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