Original Article

Telescopic Dissection Versus Gauze Dissection for Creation of Extra Peritoneal Space During Laparoscopic Totally Extra Peritoneal Inguinal Hernia Repair

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Abstract

Background: Inguinal hernia is a common surgical condition. TEP repair offers faster recovery but requires challenging preperitoneal space creation. Gauze and telescopic dissection are low-cost alternatives whose safety and effectiveness require comparative evaluation. The study compared gauze and telescopic dissection for extraperitoneal space creation in TEP inguinal hernia repair, assessing operative time, bleeding, pain, complications, recurrence, and outcomes. **Material and Methods:** The present study was a Prospective comparative interventional study. This Study was conducted from March 2020 to August 2021. Department of General Surgery, Bankura Sammilani Medical College and Hospital. Study population 60. **Results:** Among 60 male patients (30 per group), the mean age was comparable between the gauze and telescopic groups (47.33 ± 13.28 vs. 45.73 ± 12.36 years; p=0.6309). Peritoneal breach occurred in 23.3% and 46.7% patients, respectively (p=0.0581). The gauze group had significantly lower intraoperative bleeding (13.47 ± 7.20 vs. 18.40 ± 9.33 ml; p=0.0254), shorter operative time (58.83 ± 20.83 vs. 77.67 ± 24.90 min; p=0.0024), and lower pain scores on day 1 (4.93 vs. 5.47; p=0.0150) and day 7 (1.63 vs. 2.60; p=0.0001). Return to work was similar (13.10 vs. 14.07 days; p=0.2660). **Conclusion:** Both gauze and telescopic dissection were safe and effective for TEP inguinal hernia repair; however, gauze dissection provided shorter operative time, reduced intraoperative bleeding, and lower early postoperative pain with comparable complication rates.

Keywords: Inguinal hernia, Laparoscopic totally extraperitoneal repair (TEP), Telescopic dissection, Gauze dissection, Preperitoneal space creation, Operative time, Intraoperative bleeding, Postoperative pain, Peritoneal breach, Surgical outcomes.

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Introduction

Abdominal wall hernias are among the most common conditions encountered in general surgical practice and account for a significant proportion of operative workload worldwide. It is estimated that hernias constitute approximately 15%–18% of all surgical procedures, with more than 20 million hernia repairs performed globally each year.[1] Nearly three-quarters of all abdominal wall hernias occur in the groin region, making inguinal hernia the most frequent subtype.[2] The lifetime risk of developing an inguinal hernia is reported to be 15%–27% in men and around 3% in women, highlighting a strong male predominance and significant lifetime disease burden.[3] Over the past few decades, the management of inguinal hernia has undergone a major evolution from open tissue-based repairs to mesh-based tension-free techniques and, more recently, to minimally invasive laparoscopic approaches. The introduction of the Lichtenstein tension-free mesh repair revolutionized open hernia surgery by significantly reducing recurrence rates and postoperative pain compared to traditional tissue repairs.[4] Subsequently, laparoscopic techniques gained popularity following the success of minimally invasive surgery in procedures such as laparoscopic cholecystectomy. However, unlike cholecystectomy, laparoscopic inguinal hernia repair has faced persistent debate regarding its superiority, technical difficulty, and cost-effectiveness.[5] Currently, the two most widely accepted laparoscopic approaches for inguinal hernia repair are the transabdominal preperitoneal (TAPP) and the totally extraperitoneal (TEP/TEP-P) techniques. Both approaches involve placement of mesh in the preperitoneal space, reinforcing the myopectineal orifice and reducing recurrence risk. TAPP requires entry into the peritoneal cavity, whereas TEP avoids intraperitoneal access, thereby potentially reducing intra-abdominal complications such as adhesions or visceral injury.[6] Comparative studies and meta-analyses have demonstrated that TEP repair offers equivalent recurrence rates

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to TAPP and open mesh repair, with advantages including reduced postoperative pain, earlier mobilization, and faster return to normal activity.[7] Despite these benefits, laparoscopic TEP hernioplasty is widely recognized as a technically demanding procedure with a steep learning curve. A critical and often challenging step in TEP repair is the creation of the preperitoneal space. This can be achieved using either blunt telescopic dissection or balloon dissection techniques. Balloon dissectors are commonly used in developed settings; however, their high cost limits availability in resource-constrained environments, leading to the development of low-cost alternatives such as gauze or telescopic dissection methods. The efficiency and safety of these alternative methods remain important areas of surgical investigation, particularly with respect to operative time, intraoperative complications, and postoperative outcomes. The Stoppa repair, an open preperitoneal mesh technique, shares anatomical principles with laparoscopic TEP repair by reinforcing the myopectineal orifice without entering the peritoneal cavity. It is considered effective for bilateral and recurrent hernias and is associated with low recurrence rates. However, it is generally more invasive than laparoscopic approaches and may be associated with greater postoperative discomfort and slower recovery in some patient groups. The evolution of hernia surgery has been significantly influenced by advancements in mesh technology, better understanding of groin anatomy, and the adoption of evidence-based surgical practices. While early laparoscopic techniques such as stapled or plugged repairs were abandoned due to high recurrence rates, modern mesh-based laparoscopic repairs have demonstrated improved outcomes when performed by experienced surgeons. Nevertheless, controversy persists regarding the optimal approach, particularly in terms of cost, learning curve, and long-term outcomes. The most scientific way to come to conclusion over superiority of one method over other is evidence-based medicine. Laparoscopic mesh repair cannot be compared with open tissue repair. So, the comparison should be between laparoscopic mesh repair and open mesh repairs. Few of the initial trials (Liem,[8] Stoker,[9] and Grant,[10]) compared laparoscopic mesh repair with open tissue repair and came to conclusions, which are not valid.

Materials and Methods

Study design: Prospective comparative interventional study.

Place of study: Male Surgical up and Male Surgical Down Ward Female surgical up and female surgical down Department of general Surgery Bankura Sammilani Medical College and Hospital.

Period of study: From March 2020 to August 2021.

Study Population: A total number of patients of both gender admitted in surgery ward of Bankura Sammilani medical college and hospital, within 18 years and above of age with uncomplicated inguinal hernia in the period of data collection.

Sample size: 60 patients.

Inclusion Criteria:

- 18 Years of age or older
- Able to give informed consent
- Unilateral inguinal hernia
- Scheduled for elective inguinal hernia repair
- Eligible to tolerate general anesthesia
- Eligible to undergo minimally invasive inguinal hernia repair
- Willing to undergo mesh-based repair

Exclusion criteria:

- Younger than 18 years old
- Unable to give informed consent
- Bilateral Inguinal hernias
- Emergent inguinal hernia repairs (acute incarceration or strangulation)
- Recurrent inguinal hernia with prior pre peritoneal mesh
- Unable to tolerate general anesthesia
- Not eligible for minimally invasive inguinal hernia repair
- Not willing to undergo mesh-based repair

Study Variable:

- Age, Residence (urban/Rural), Occupation, Smoking history, History of tuberculosis or contact history, Comorbidity (chronic cough, beningn prostatic hypertrophy, constipation), Duration of hernia, Type of inguinal hernia and Recurrent hernia or not.
- Dissection of pre peritoneal space with sterile gauze/telescope, Conversion of Totally extra peritoneal repair to trans abdominal pre peritoneal repair or Open hernioplasty, Length of hospital stay.
- Post-operative pain as per numerical rating scale pain score on day1, day 7 and day 30, Intra operative complication

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

Results

In Gauze piece, 6 (20.0%) patients were 21-30 years old, 3 (10.0%) patients were 31-40 years old, 9 (30.0%) patient were 41-50 years old, 6 (20.0%) patients were 51-60 years old and 6 (20.0%) patients were 61-70 years old. In Telescopic, 4 (13.3%) patients were 21-30 years old, 6 (20.0%) patients were 31-40 years old, 6 (20.0%) patient were 41-50 years old, 11 (36.7%) patients were 51-60 years old and 3 (10.0%) patients were 61-70 years old. Association of Age in group with Dissection of pre peritoneal space Gauze piece/Telescopic was not statistically significant (p=0.3460). In Gauze piece, the mean Age of patients was 47.3333± 13.2804. In Telescopic, the mean Age of patients was 45.7333± 12.3649. Distribution of mean

Age with Dissection of pre peritoneal space was not statistically significant (p=0.6309). In Gauze piece, all patients [30 (100.0%)] were Male. In Telescopic, all patients [30 (100.0%)] were Male [Table 1].

In Gauze piece, 7 (23.3%) patients had Peritoneal breech. In Telescopic, 14 (46.7%) patients had Peritoneal breech. Association of Peritoneal breech with Dissection of pre peritoneal space Gauze piece/Telescopic was not statistically significant (p=0.0581) [Table 2].

In Gauze piece, 1 (3.3%) patient was day 10 Seroma Post op complications and 1 (3.3%) patient was day 30 Seroma Post op complications. In Telescopic, 4 (13.3%) patients were day 10 Seroma Post op complications and 3 (10.0%) patients were day 30 Seroma Post op complications. Association of Seroma Post op complications with Dissection of pre peritoneal space Gauze piece/Telescopic was not statistically significant (p=0.1930). In Gauze piece, 1 (3.3%) patient was day 10 Infection Post op complications. In Telescopic, 1 (3.3%) patient was day 10 Infection Post op complications and 3 (10.0%) patients were day 4 Infection Post op complications. Association of Infection Post op complications with Dissection of preperitoneal space Gauze piece/Telescopic was not statistically significant (p=0.2056) [Table 3].

In Gauze piece, the mean Intra Operative bleeding (ml) of patients was 13.4667 ± 7.1955. In Telescopic, the mean Intra Operative bleeding (ml) of patients was 18.4000 ± 9.3277. Distribution of mean Intra Operative bleeding (ml) with Dissection of pre peritoneal space was statistically significant (p=0.0254). In Gauze piece, the mean Operative time (mins) of patients was 58.8333 ± 20.8311. In Telescopic, the mean Operative time (mins) of patients was 77.6667 ± 24.9044. Distribution of mean Operative time (mins) with Dissection of pre peritoneal space was statistically significant (p=0.0024) [Table 4].

In Gauze piece, the mean Post op pain Day1 of patients was 4.9333 ± .7397. In Telescopic, the mean Post op pain Day1 of patients was 5.4667 ± .8996. Distribution of mean Post op pain Day1 with Dissection of pre peritoneal space was statistically significant (p=0.0150). In Gauze piece, the mean Post op Day 7 of patients was 1.6333 ± .8899. In Telescopic, the mean Post op Day 7 of patients was 2.6000 ± .8944. Distribution of mean Post op Day 7 with Dissection of pre peritoneal space was statistically significant (p=0.0001). In Gauze piece, the mean Post op Day 30 of patients was .0333± .1826. In Telescopic, the mean Post op Day 30 of patients was .0667 ± .2537. Distribution of mean Post op Day 30 with Dissection of pre peritoneal space was not statistically significant (p=0.6719) [Figure 1].

In Gauze piece, the mean Return to work (days) of patients was 13.1000 ± 3.7264. In Telescopic, the mean Return to work (days) of patients was 14.0667 ± 2.8879. Distribution of mean Return to work (days) with Dissection of pre peritoneal space was not statistically significant (p=0.2660) (Figure 2).

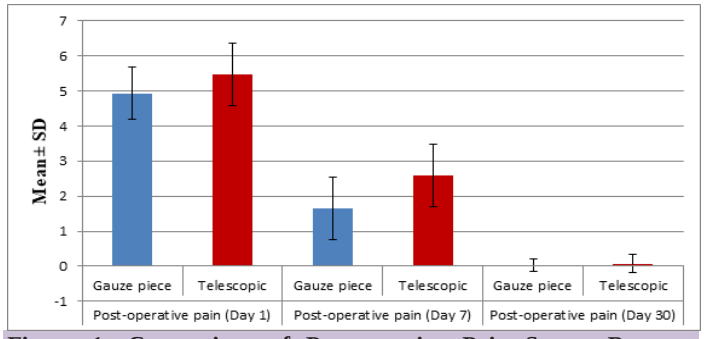

Figure 1: Comparison of Postoperative Pain Scores Between Gauze Piece and Telescopic Groups at Different Time Intervals

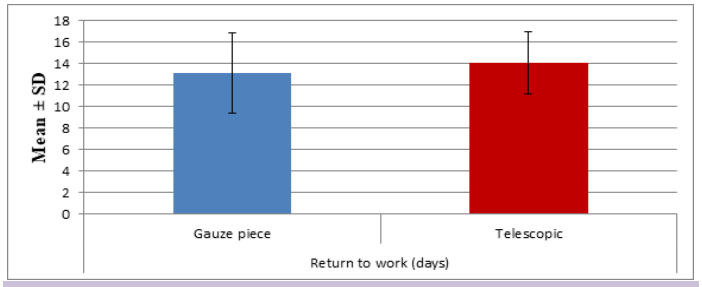

Figure 2: Distribution of mean Return to work (days): Dissection of pre peritoneal space Gauze piece/Telescopic

Table 1: Age and Gender Distribution of Patients According to Surgical Technique (Gauze Piece vs Telescopic Group)

Variable	Category	Gauze piece n (%)	Telescopic n (%)	Total n (%)/p-value
Age	21–30	6 (20.0%)	4 (13.3%)	10 (16.7%)
	31–40	3 (10.0%)	6 (20.0%)	9 (15.0%)
	41–50	9 (30.0%)	6 (20.0%)	15 (25.0%)
	51–60	6 (20.0%)	11 (36.7%)	17 (28.3%)
	61–70	6 (20.0%)	3 (10.0%)	9 (15.0%)
	Total	30 (100.0%)	30 (100.0%)	60 (100.0%)
Age(Mean ± SD)	Gauze piece	47.3333 ± 13.2804	47.3333 ± 13.2804	0.6309
	Telescopic	45.7333 ± 12.3649	45.7333 ± 12.3649	
Gender	Male	30 (100.0%)	30 (100.0%)	60 (100.0%)
	Total	30 (100.0%)	30 (100.0%)	60 (100.0%)

Table 2: Intraoperative and Postoperative Findings in Gauze Piece and Telescopic Groups

Variable	Category	Gauze piece n (%)	Telescopic n (%)	Total n (%)
Peritoneal breech	No	23 (76.7%)	16 (53.3%)	39 (65.0%)
	Yes	7 (23.3%)	14 (46.7%)	21 (35.0%)
	Total	30 (100.0%)	30 (100.0%)	60 (100.0%)
Post-op drain	No	30 (100.0%)	30 (100.0%)	60 (100.0%)
	Total	30 (100.0%)	30 (100.0%)	60 (100.0%)

Hematoma (post-op complications)	No	30 (100.0%)	30 (100.0%)	60 (100.0%)
	Total	30 (100.0%)	30 (100.0%)	60 (100.0%)

Table 3: Postoperative Complications (Seroma and Wound Infection) in Gauze Piece and Telescopic Groups Over Follow-up Period

Variable	Category	Gauze piece n (%)	Telescopic n (%)	Total n (%)
Seroma	Day 10	1 (3.3%)	4 (13.3%)	5 (8.3%)
	Day 30	1 (3.3%)	3 (10.0%)	4 (6.7%)
	No	28 (93.3%)	23 (76.7%)	51 (85.0%)
	Total	30 (100.0%)	30 (100.0%)	60 (100.0%)
Infection	Day 4	0 (0.0%)	3 (10.0%)	3 (5.0%)
	Day 10	1 (3.3%)	1 (3.3%)	2 (3.3%)
	No	29 (96.7%)	26 (86.7%)	55 (91.7%)
	Total	30 (100.0%)	30 (100.0%)	60 (100.0%)

Table 4: Comparison of Baseline and Intraoperative Parameters Between Gauze Piece and Telescopic Groups

Variable	Group	Mean ± SD	p-value
Intraoperative bleeding (ml)	Gauze piece	13.4667 ± 7.1955	0.0254
	Telescopic	18.40 ± 9.3277	
Operative time (mins)	Gauze piece	58.83 ± 20.8311	0.0024
	Telescopic	77.67 ± 24.9044	

Discussion

The age distribution showed no significant difference between the two groups. In the gauze dissection group, 6 (20.0%) patients were aged 21–30 years, 3 (10.0%) were 31–40 years, 9 (30.0%) were 41–50 years, 6 (20.0%) were 51–60 years, and 6 (20.0%) were 61–70 years. In the telescopic group, 4 (13.3%) patients were 21–30 years, 6 (20.0%) were 31–40 years, 6 (20.0%) were 41–50 years, 11 (36.7%) were 51–60 years, and 3 (10.0%) were 61–70 years. The association of age distribution with technique was not statistically significant (p=0.3460). The mean age in the gauze group was 47.3333 ± 13.2804 years, while in the telescopic group it was 45.7333 ± 12.3649 years, which was also not statistically significant (p=0.6309). In the present study, all patients in both groups were male, i.e., 30 (100.0%) in gauze and 30 (100.0%) in telescopic group, reflecting the known male predominance of inguinal hernia (Soler M et al,[12] Tastaldi L et al,[11]).

Peritoneal breech was observed in 7 (23.3%) patients in the gauze group and 14 (46.7%) patients in the telescopic group. Although the incidence was higher in the telescopic group, the association was not statistically significant (p=0.0581), which is in concordance with previous literature suggesting variable rates of peritoneal injury depending on dissection technique (Yang C, Deng S et al,[13]). This suggests a trend towards increased peritoneal injury with telescopic dissection, possibly due to more extensive blunt dissection required for space creation.

Postoperative complications showed low incidence. Seroma formation occurred in 1 (3.3%) patient at day 10 and 1 (3.3%) at day 30 in the gauze group, whereas in the telescopic group it was seen in 4 (13.3%) patients at day 10 and 3 (10.0%) patients at day 30. However, this difference was not statistically significant (p=0.1930), consistent with international guideline observations that seroma rates vary but are generally low in minimally invasive groin hernia repair (Tumtavitikul S et al,[14]). Infection was also rare, with 1 (3.3%) patient in the gauze group at day 10, while in the telescopic group 1 (3.3%) patient had infection at day 10 and 3 (10.0%) patients at day 4. This difference was also not statistically significant (p=0.2056), which aligns with large comparative series demonstrating similar infectious profiles between laparoscopic techniques (Köckerling F et al). Hematoma was not observed in either group.[15]

Intraoperative parameters showed significant differences. Mean intraoperative bleeding was significantly lower in the gauze group (13.4667 ± 7.1955 ml) compared to the telescopic group (18.4000 ± 9.3277 ml), with statistical significance (p=0.0254), supporting findings from minimally invasive comparative studies favoring reduced tissue trauma approaches (Meier J et al,[16]). Similarly, operative time was significantly shorter in the gauze group (58.8333 ± 20.8311 minutes) compared to the telescopic group (77.6667 ± 24.9044 minutes), with high statistical significance (p=0.0024), consistent with large database analyses highlighting efficiency advantages in optimized laparoscopic techniques (Pokala B et al).[17]

Postoperative pain scores were significantly lower in the gauze group on day 1 (4.9333 ± 0.7397 vs 5.4667 ± 0.8996, p=0.0150) and day 7 (1.6333 ± 0.8899 vs 2.6000 ± 0.8944, p=0.0001), indicating better early postoperative comfort. However, by day 30, pain was minimal in both groups (0.0333 ± 0.1826 vs 0.0667 ± 0.2537), and the difference was not statistically significant (p=0.6719), which is in agreement with contemporary reviews describing convergence of long-term outcomes after laparoscopic groin hernia repair (Capoccia Giovannini S et al).[18]

Return to work was slightly earlier in the gauze group (13.1000 ± 3.7264 days) compared to the telescopic group (14.0667 ± 2.8879 days), but this difference was not statistically significant (p=0.2660), reflecting current trends in hernia surgery emphasizing rapid recovery irrespective of minor technical variations (Pawlak M et al, Vorst AL et al).[19,20]

Conclusion

In this study comparing telescopic dissection and gauze dissection for creation of the extra-peritoneal space during laparoscopic totally extra-peritoneal (TEP) inguinal hernia repair, both techniques were found to be safe and feasible.

Telescopic dissection was associated with longer operative time and higher intraoperative bleeding compared to gauze dissection. However, postoperative outcomes including seroma formation, infection, and hematoma were comparable between the two groups. Pain scores showed variation at early follow-up but equalized later. Gauze dissection demonstrated better efficiency, while telescopic dissection remains an acceptable alternative with similar safety outcomes.

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Conflicts of interest
There are no conflicts of interest.

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