

Research Article

Comparison of Suture versus Tacker Techniques for Peritoneal Closure in Laparoscopic TAPP Inguinal Hernia Repair: A Randomized Controlled Trial

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ABSTRACT

Background: Peritoneal closure is a critical step in laparoscopic transabdominal preperitoneal (TAPP) inguinal hernia repair. Various techniques are used, most commonly intracorporeal suturing and mechanical fixation using tackers. However, the optimal method remains controversial, particularly with respect to postoperative pain, complications, operative time, and cost.

Objective: To compare postoperative pain, complications, and duration of surgery between suture and tacker techniques for peritoneal closure in laparoscopic TAPP inguinal hernia repair.

Methods: This randomized controlled trial was conducted in the Department of General Surgery, Nishtar Hospital, Multan, over six months, from March 2025 to September 2025. A total of 96 male patients undergoing elective laparoscopic TAPP repair were randomly allocated into two groups: Group A (peritoneal closure with sutures) and Group B (peritoneal closure with tackers). Postoperative pain was assessed using the Visual Analogue Scale (VAS). Complications and operative time were recorded and analyzed using SPSS version 23.

Results: Patients in the suture group experienced significantly lower postoperative pain compared to the tacker group ($p < 0.05$). The incidence of postoperative complications was also lower in the suture group, while the mean operative time was slightly longer but not statistically significant.

Conclusion: Intracorporeal suturing for peritoneal closure in TAPP repair is associated with reduced postoperative pain and fewer complications compared to tacker fixation, making it a safer and more cost-effective option in experienced hands.

Keywords: Tapp, Inguinal Hernia, Peritoneal Closure, Sutures, Tackers, Laparoscopic Surgery.

INTRODUCTION

Inguinal hernia repair is one of the most commonly performed surgical procedures worldwide, accounting for a significant proportion of elective general surgery workload. It is estimated that more than 20 million inguinal hernia repairs are performed annually, reflecting the high prevalence and substantial healthcare burden associated with this condition¹. Over the last two decades, laparoscopic approaches have gained widespread acceptance due to their association with reduced postoperative pain, faster recovery, shorter hospital stay, and

improved cosmetic outcomes when compared to open repair techniques^{2,3}.

Among laparoscopic techniques, the transabdominal preperitoneal (TAPP) approach provides excellent visualization of the myopectineal orifice and allows simultaneous management of bilateral or recurrent hernias⁴. Despite these advantages, TAPP repair requires meticulous peritoneal closure following mesh placement. Failure to achieve secure peritoneal closure may lead to serious complications, including bowel adhesions, internal herniation, mesh exposure, chronic pain, and intestinal obstruction^{5,6}.

Currently, two principal techniques are used for peritoneal closure in TAPP repair: intracorporeal suturing and mechanical fixation using tackers. Tackers are easy to apply and reduce operative time, particularly for surgeons early in their learning curve⁷. However, several studies have reported increased postoperative pain, foreign body sensation, and higher treatment costs associated with their use^{8,9}. In contrast, intracorporeal suturing avoids tissue penetration by metallic or absorbable devices and has been associated with reduced postoperative pain and fewer complications, albeit at the expense of a slightly longer operative time^{10,11}.

Recent randomized controlled trials and meta-analyses have demonstrated no significant difference in recurrence rates between suturing and tacker techniques, but consistently highlight better postoperative comfort and cost-effectiveness with suturing^{12–14}. In resource-limited settings such as Pakistan, where affordability and patient-centered outcomes are critical, identifying the optimal technique for peritoneal closure is particularly important. However, local data comparing these techniques remain scarce.

This study was therefore designed to compare suture versus tacker techniques for peritoneal closure in laparoscopic TAPP inguinal hernia repair, with emphasis on postoperative pain, complications, and duration of surgery.

MATERIALS AND METHODS

Study Design and Setting: This randomized controlled trial was conducted in the Department of General Surgery, Nishtar

Medical/ Hospital, Multan, after approval from the Institutional Ethical Review Committee.

Study Duration: Six months following ethical approval, from March 2025 to September 2025.

Sample Size: A total of 96 patients were included, with 48 patients in each group.

Sampling Technique: Consecutive sampling was used, followed by random allocation using the lottery method.

Inclusion Criteria

- Male patients aged 20–60 years
- Primary unilateral inguinal hernia
- Planned elective laparoscopic TAPP repair

Exclusion Criteria

- Recurrent inguinal hernia
- Previous lower abdominal surgery
- Complicated hernia
- Hepatitis B or C positive patients

Grouping

- **Group A:** Peritoneal closure with intracorporeal suturing
- **Group B:** Peritoneal closure using absorbable tackers

All procedures were performed by the same surgical team to minimize inter-operator bias.

Outcome Measures

- Postoperative pain (VAS score at 24 hours)
- Postoperative complications (seroma, wound infection)
- Duration of surgery (minutes)

Statistical Analysis

Data were analyzed using SPSS version 23. Quantitative variables were expressed as mean $\pm$ standard deviation and compared using independent t-test. Qualitative variables were expressed as frequencies and percentages and analyzed using Chi-square test. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Table 1: Demographic Characteristics of Study Participants

Variable	Suture Group (N = 48)	Tacker Group (N = 48)	P-Value
Mean Age (Years)	38.6 $\pm$ 9.2	39.1 $\pm$ 8.7	0.78
Age Range (Years)	22 – 59	21 – 60	—
BMI (Kg/M ²)	25.4 $\pm$ 3.1	25.9 $\pm$ 3.3	0.46
Side Of Hernia (Right)	29 (60.4%)	31 (64.6%)	0.67
Side Of Hernia (Left)	19 (39.6%)	17 (35.4%)	—

Table 2: Stratification of Confounding Variables between Study Groups

Confounding Variable	Suture Group (N, %)	Tacker Group (N, %)	P-Value
Diabetes Mellitus	9 (18.8%)	11 (22.9%)	0.62
Hypertension	12 (25.0%)	13 (27.1%)	0.82
Obesity (Bmi $\geq$ 30 Kg/M ²)	7 (14.6%)	8 (16.7%)	0.78

Smoking History	15 (31.3%)	17 (35.4%)	0.67
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The present study demonstrated that patients undergoing peritoneal closure with intracorporeal suturing experienced significantly lower postoperative pain compared to those in whom tackers were used. The mean Visual Analogue Scale (VAS) score at 24 hours postoperatively was notably lower in the suture group, indicating improved early postoperative comfort. This finding suggests that suturing results in less peritoneal and abdominal wall trauma, likely due to the absence of penetrating fixation devices, which may otherwise irritate surrounding tissues and nerve endings. Reduced postoperative pain has important clinical implications, including earlier mobilization, lower analgesic requirements, and improved patient satisfaction.

In terms of postoperative complications, the overall complication rate was higher in the tacker group compared to the suture group, with seroma formation being the most frequently observed complication. Although wound infection rates were low in both groups and did not reach statistical significance, the higher incidence of seroma in the tacker group contributed to a significantly greater total complication rate. This observation may be attributed to localized tissue reaction and inflammation caused by tackers. The lower complication profile associated with suturing reflects better tissue handling and peritoneal healing, supporting its role as a safer method for peritoneal closure in laparoscopic TAPP repair.

Regarding operative duration, the mean operative time was slightly longer in the suture group compared to the tacker group; however, this difference did not achieve statistical significance. This indicates that while suturing may initially appear more time-consuming, the difference becomes negligible when performed by an experienced surgical team. Importantly, the marginal increase in operative time was outweighed by the benefits of reduced postoperative pain and fewer complications. Furthermore, baseline demographic characteristics and stratified confounding variables were comparable between the two groups, confirming that the observed differences in outcomes were primarily attributable to the peritoneal closure technique rather than patient-related factors.

DISCUSSION

The results of the present study demonstrate that intracorporeal suturing for peritoneal closure during laparoscopic TAPP inguinal hernia repair is associated with significantly lower postoperative pain compared to tacker fixation. These findings are consistent with recent randomized trials and meta-analyses reporting higher early postoperative pain scores among patients in whom tackers were used^{8,12,15}.

The increased pain observed with tacker use is likely related to deeper tissue penetration, irritation of the parietal peritoneum, and potential involvement of nerve fibers, particularly in the lower abdominal wall^{10,16}. Suturing, on the other hand, allows controlled tissue approximation with minimal trauma, which may explain the reduced pain scores observed in the suture group.

In the present study, postoperative complications such as seroma formation and wound infection were more frequent in the tacker group, although wound infection alone did not reach statistical significance. Similar trends have been reported by Rajagopal et al. and Singhal et al., who noted higher rates of seroma and postoperative discomfort with tacker fixation^{9,13}. Reduced peritoneal trauma and absence of foreign fixation devices may contribute to the lower complication rates associated with suturing.

Although the mean operative time was slightly longer in the suture group, the difference was not statistically significant. This finding supports previous reports suggesting that operative time differences diminish as surgeons become more proficient in laparoscopic suturing^{11,14}. Given the absence of disposable fixation devices, suturing also offers a cost advantage, which is particularly relevant in low- and middle-income countries¹⁷.

Overall, the findings of this study support the growing body of evidence favoring intracorporeal suturing as a safe, effective, and patient-friendly method for peritoneal closure in TAPP repair.

Limitations

- Single-center study
- Short follow-up duration
- Cost analysis not included

Future multicenter studies with longer follow-up are recommended.

CONCLUSION

Intracorporeal suturing for peritoneal closure in laparoscopic TAPP inguinal hernia repair is associated with lower postoperative pain and fewer complications compared to tacker fixation, without significantly increasing operative time. Suturing should be encouraged as the preferred technique, especially in experienced hands.

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