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Post-Operative Events Following Mesh Fixation By Pds Tackers Vs Vicryl Polypropylene 1-0 Suture In Transabdominal Preperitoneal Inguinal Hernia Repair: A Randomized Control Trial

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Abstract

Background: *The deployment of laparoscopic inguinal hernia repairs requires mesh fixation by two distinct options between sutures and tackers. The method of mesh attachment influences both the emergence of postoperative pain and duration of surgical procedure and associated hospitalization time and complications. The examination evaluated the postoperative patient outcomes between absorbable PDS tackers and Vicryl polypropylene 1-0 sutures in TAPP inguinal hernia repair procedures.*

Methods: *The control trial study accepted 60 adult patients who required planned TAPP surgical repair for their groin hernias which either occurred individually or both sides simultaneously. Following enrollment the participants were distributed into two specific groups with thirty participants in each subgroup. The subjects in the "tacker group" underwent mesh fixation with PDS tackers yet the "suture group" required Vicryl polypropylene 1-0 sutures for mesh fixation. IBM SPSS Version 23.0 analyzed all gathered data from patient population characteristics until the duration of surgery and VAS pain scores and hospital stay time and complications data. The research established 0.05 or lower p-values as its threshold criterion to indicate statistical significance.*

Results: *All initial group-related variables remained similar. Patients who received Tacker tacks needed 74.0±24.0 minutes for their operations but patients who received sutures needed 82.0±31.5 minutes according to statistical data (p=0.27). The tacker group experienced the same degree of post-operative pain across days 1, 7 and 14. The pain scores from patients who received sutures decreased more than those who received tackers measurements at both the first month and third month (p=0.02). Hospitalization duration and immediate postoperative complications displayed no significant differences between both groups based on the p values above 0.05. Patients with sutures experienced moderately improved pain management compared to other patients throughout their long recovery times.*

Conclusion: *Following TAPP hernia procedures with Vicryl polypropylene 1-0 suture mesh fixation patients demonstrated decreased pain levels during later stages yet they had similar operating times and short-term complications like patients using PDS tacker fixation. Research confirms that suture closure techniques help reduce postoperative pain without affecting the processing outcomes of the treatment.*

Keywords: *Laparoscopic inguinal hernia repair, TAPP, mesh fixation, tackers, sutures, postoperative pain*

INTRODUCTION

General surgical practitioners perform inguinal hernia repair as one of their most habitually conducted surgical procedures worldwide yet continue to focus more strongly on minimal intervention methods [1]. Researchers typically perform the two main laparoscopic procedures as TAPP and TEP approaches. People regain their daily activities faster and experience less pain after laparoscopic hernia repair because of its benefits compared to standard open surgery [2]. Several aspects of laparoscopic inguinal hernia repair mesh fixation require ongoing discussion among medical professionals despite broader advantages of the procedure. Mesh fixation needs to be sufficiently tight because it enables efficient mesh anchoring while minimizing occurrences of mesh movement and hernia recurrence as well as groin pain outcomes [3].

Mesh can be secured in laparoscopic hernia repair using a variety of fixation devices such as staples, tacks, or sutures. Absorbable tackers (e.g., made of polydioxanone [PDS]) have gained popularity due to their proposed lower risk of chronic pain from reduced tissue irritation compared to permanent metallic tacks [4]. However, there are concerns about the stability of absorbable fixation over time and whether it provides sufficient anchorage of the mesh to prevent recurrence [5]. On the other hand, suture fixation,

especially with synthetic absorbable or partially absorbable suture materials, offers a more controlled and cost-effective alternative, although it may be technically more time-consuming to perform, particularly in laparoscopic procedures [6].

Chronic groin pain is a significant issue affecting quality of life after inguinal hernia repair [7]. The intensity and chronicity of postoperative pain can be influenced by the method of mesh fixation, possibly due to nerve entrapment or tissue tension. Hence, determining the ideal fixation method—particularly whether suture fixation produces better long-term pain outcomes or if tackers offer a sufficiently less painful and more convenient approach—has been the focus of multiple clinical investigations [8].

Through this randomized control trial we studied the postoperative outcomes particularly measuring postoperative pain intensity of laparoscopic TAPP inguinal hernia repair patients who received either absorbable PDS tackers or Vicryl polypropylene 1-0 sutures for mesh fixation. The trial tested pain intensity through different postoperative periods with duration of surgery and hospital stay along with identifying postoperative complications serving as secondary targets. The study examined key parameters in order to develop evidence that would assist surgeons when picking appropriate mesh fixation approaches for TAPP inguinal hernia surgery.

MATERIALS AND METHODS

Study Design and Setting

The research took place during a twelve-month period (January 2023 through December 2023) within KLES Dr. Prabhakar Kore Hospital & Medical Research Centre in Belagavi, India. A study approval from the institutional ethical committee allowed research to start along with participant consent for involvement in this study.

Study Population and Sampling

Patients 18 years of age or older, undergoing elective TAPP repair for unilateral or bilateral inguinal hernia, who gave informed consent, were considered eligible for inclusion. Exclusion criteria included uncontrolled type II diabetes mellitus, uncontrolled hypertension, previous abdominal surgeries for the same pathology, generalized peritonitis, inability to tolerate pneumoperitoneum, uncorrected coagulopathy, and hemodynamic instability.

A sample size of 60 was determined based on a statistical calculation:

$$n = \frac{Ny}{(N-1)e + y}$$

where:

$$Z = 1.64, \quad p = 0.25, \quad q = (1-p) = 0.75$$

$$y = Z^2 \times p \times q = 1.64^2 \times 0.25 \times 0.75 = 0.50625$$

$$n = \frac{125 \times 0.50625}{(125-1) \times 0.0237 + 0.50625} \approx 29.68$$

Rounded up, the required sample size was 30 in each group (total 60).

Randomization and Group Allocation

Patients were randomly assigned into two groups of 30 each:

1. **Suture Group**: Mesh fixation with Vicryl polypropylene 1-0 sutures.
2. **Tacker Group**: Mesh fixation using absorbable PDS tackers.

Randomization was done using a computer-generated random sequence. The assigned method of fixation was revealed to the operating surgeon immediately prior to the procedure.

Surgical Technique

Under general anesthesia, a standard laparoscopic TAPP technique was followed. A peritoneal flap was raised to expose the myopectineal orifice. The hernial sac was identified, reduced, and the appropriate mesh (polypropylene) of sufficient size to cover the defect was placed over the myopectineal orifice. In the suture group, Vicryl polypropylene 1-0 was used to secure the mesh at four cardinal points (or as required). In the tacker group, mesh fixation was performed using PDS tackers placed around the periphery of the mesh.

Data Collection

Patient demographics (age, gender), hernia type (unilateral or bilateral), operative time, and intraoperative complications were recorded in a standardized proforma. Postoperative data included pain scores measured on a Visual Analog Scale (VAS) on postoperative day (POD) 1, 7, 14, 1 month, and 3 months. Additional data on length of hospital stay and postoperative complications (seroma, hematoma, wound infection, chronic pain, recurrence) were documented.

Statistical Analysis

The researchers utilized Microsoft Excel for data transfer before processing the information using IBM SPSS Version 23.0. Statistics describing the data were shown as standard deviations and means for continuous variables as well as percentages for categorical variables. The comparison of group means employed Student's t-test (unpaired). Chi-square and Fisher's exact test stood as the appropriate methods for determining proportional comparisons. All statistical values beneath 0.05 indicated significance in this study.

RESULTS

A total of 60 patients were enrolled, with 30 in each group (Suture vs. Tacker). Both groups were comparable in terms of demographic distribution and hernia characteristics.

Overall Findings (Descriptive Overview)

Most patients were males (73.3% in the suture group vs. 76.7% in the tacker group). The mean age was 45.7±13.1 years for the suture group and 46.3±15.7 years for the tacker group (p=0.866). Bilateral inguinal hernia was noted in around 30% of the patients in both groups. No major intraoperative complications (e.g., bowel injury, vascular injury) were documented.

Below, key parameters and clinical outcomes are summarized in tables and figures:

TABLE 1. COMPARISON OF MEAN AGE OF PATIENTS BETWEEN THE GROUPS

Group	Mean Age (years)	SD	p-value
Suture	45.7	13.1	0.866
Tacker	46.3	15.7	

Both groups showed a comparable age distribution (p=0.866).

TABLE 2. DISTRIBUTION OF GENDER BETWEEN THE GROUPS

Gender	Suture (n=30)	Tacker (n=30)
Female	8 (26.7%)	7 (23.3%)
Male	22 (73.3%)	23 (76.7%)

Gender distribution was similar in both groups, with a male preponderance.

TABLE 3. COMPARISON OF DIAGNOSIS AND TYPE OF INGUINAL HERNIA BETWEEN THE GROUPS

	Suture (n=30)	Tacker (n=30)	p-value
Bilateral Hernia	9 (30.0%)	8 (26.7%)	0.54
Left Inguinal Hernia	9 (30.0%)	13 (43.3%)	
Right Inguinal Hernia	12 (40.0%)	9 (30.0%)	

No statistically significant difference was observed in the distribution of hernia types between the two groups.

TABLE 4. COMPARISON OF MEAN OPERATIVE TIME BETWEEN THE GROUPS

Group	Operation Time (minutes)	SD	p-value
Suture	82.0	31.5	0.27
Tacker	74.0	24.0	

The mean operative times were not statistically different between groups (p=0.27).

Postoperative Pain

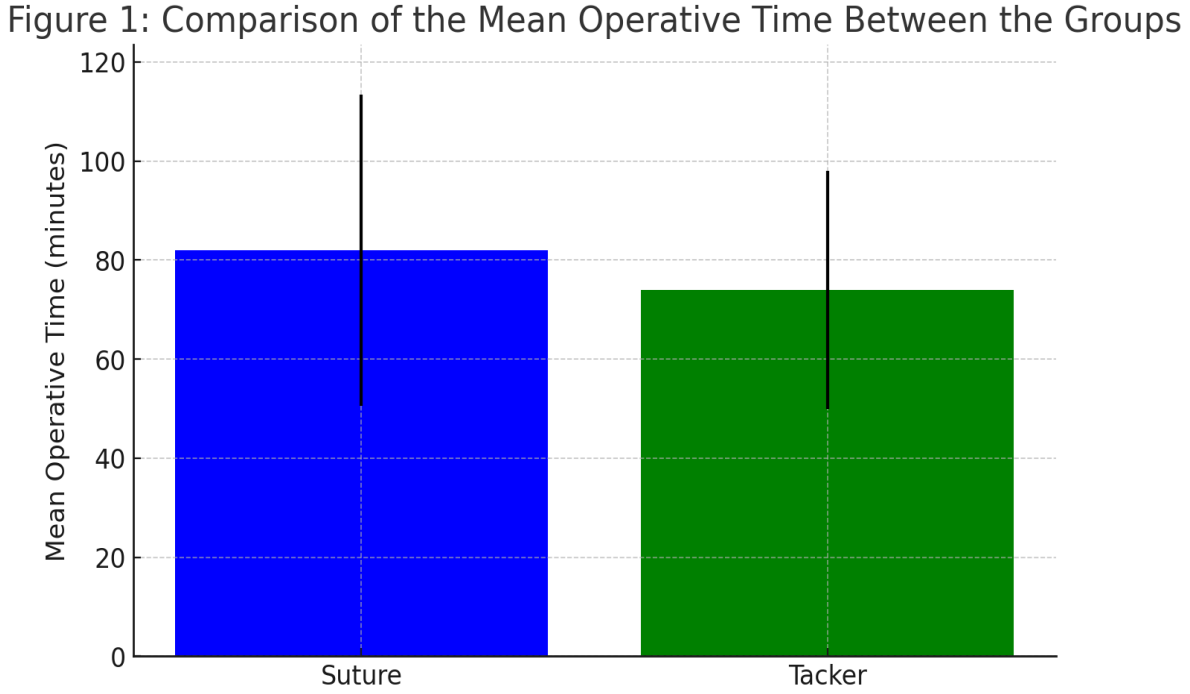
Postoperative pain was evaluated on POD1, POD7, POD14, 1 month, and 3 months. Pain scores were comparable on POD1, POD7, and POD14. However, at 1 month and 3 months, pain scores were significantly lower in the suture group (p=0.02).

TABLE 5. COMPARISON OF POSTOPERATIVE PAIN SCORE (VAS) BETWEEN THE GROUPS

Day	Suture (Mean ± SD)	Tacker (Mean ± SD)	p-value
POD1	7.9 ± 1.6	8.1 ± 1.1	0.51
POD7	5.2 ± 1.7	5.5 ± 1.4	0.55
POD14	3.2 ± 1.6	3.5 ± 1.3	0.42
1 Month	1.3 ± 1.2	2.2 ± 1.1	0.02*
3 Months	0.6 ± 0.7	1.6 ± 0.9	0.02*

*Statistically significant (p<0.05)

FIGURE 1. COMPARISON OF THE MEAN OPERATIVE TIME BETWEEN THE GROUPS



Displays the comparison of the mean operative time between the suture and tacker groups, using a bar chart with error bars to show the standard deviation.

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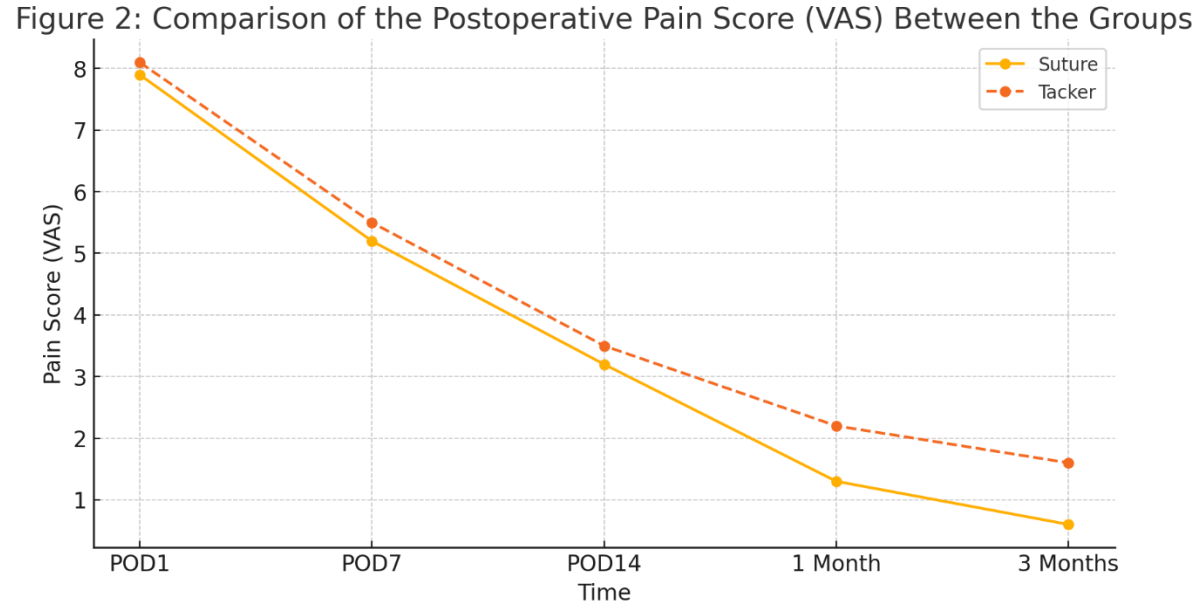
FIGURE 2. COMPARISON OF THE POSTOPERATIVE PAIN SCORE (VAS) BETWEEN THE GROUPS



Illustrates the trend of postoperative pain scores (VAS) over various time points (POD1, POD7, POD14, 1 month, and 3 months) for both groups, using a line graph.

Other Secondary Outcomes

- **Hospital Stay**: The duration of hospital stay (typically 2–3 days) did not differ significantly between the two groups ($p>0.05$).
- **Postoperative Complications**: Seroma and hematoma were noted in a few cases but were comparable between groups. No mesh migration, significant wound infection, or recurrence was reported during the follow-up period.

Mesh fixation and preperitoneal plane closure with suture

Mesh fixation and preperitoneal plane closure with tacker

DISCUSSION

Laparoscopic hernia repair via the TAPP approach has garnered attention due to its reduced incidence of wound-related complications, shorter recovery time, and lower postoperative pain compared to open repairs [1, 2]. Nonetheless, the optimal technique for mesh fixation remains debated, particularly regarding chronic pain and recurrence [3]. Our findings indicate that while immediate postoperative pain (POD1, POD7, POD14) was similar in both the tacker and suture groups, the suture fixation group demonstrated significantly lower pain scores at one and three months postoperatively. This suggests that the choice of fixation material may influence medium- to long-term pain outcomes, potentially due to differences in local tissue response and nerve irritation [4].

Previous studies have reported that absorbable tackers may mitigate chronic groin pain compared to permanent tackers by reducing hardware-related irritation and nerve entrapment over time [5]. However, in this study, patients who received suture fixation had comparatively lower late pain scores than those with absorbable PDS tacker fixation. One possible explanation is that suture fixation allows for more precise placement and tension control, thereby reducing the risk of inadvertent nerve entrapment [6]. Additionally, the mechanical forces exerted by tackers, even if absorbable, could persist over a sufficient period to provoke localized inflammatory responses [7].

Our data also showed no statistically significant difference in operative time or immediate complications between the two groups, consistent with some randomized trials that found no major impact of fixation technique on these parameters [8]. Although one might presume that suture fixation requires more operative time, the findings indicate that in experienced hands, the difference may be minimal and not clinically consequential. Importantly, no recurrences were reported in either group during the follow-up period, suggesting that both fixation methods provide adequate mesh stability.

A potential limitation of this study is that pain perception can be subjective. We utilized the VAS scale to quantify pain; while this is a validated measure, it may still be influenced by individual tolerance and psychosocial factors. Moreover, the follow-up period of three months, although sufficient to assess subacute and some chronic pain outcomes, may not capture late recurrences or very late onset chronic pain. Future studies with longer follow-up could provide more comprehensive insights into recurrence rates and chronic pain outcomes beyond three months.

Despite these limitations, the present study adds valuable evidence supporting the role of suture fixation in potentially reducing long-term postoperative pain. Surgeons should consider these findings when selecting a fixation technique for TAPP inguinal hernia repair, balancing the benefits of tackers against the possibility of enhanced comfort and equivalent operative metrics with suture fixation.

CONCLUSION

This randomized control trial suggests that mesh fixation using Vicryl polypropylene 1-0 sutures during TAPP inguinal hernia repair leads to comparable operative times and short-term complications when compared with absorbable PDS tackers, while providing significantly lower pain scores at one and three months postoperatively. Both methods appeared safe and effective in preventing recurrence within the study period. Given the trend toward lower late postoperative pain with sutures, surgeons may opt for suture fixation to improve patient comfort without compromising surgical efficacy. Larger trials with extended follow-up are recommended to further validate these findings.

REFERENCES

1. Leibl BJ, Schmedt CG, Kraft K, et al. Laparoscopic transperitoneal hernia repair. Surg Endosc. 2000;14(8):785-789.
2. Bittner R. Laparoscopic Hernia Repair – TAPP or/and TEP? Front Surg. 2014;1:15.
3. Ferzli GS, Edwards ED, Cantlie J. Mesh fixation in TAPP hernia repair: Should it always be performed? Hernia. 2000;4(4):215-217.
4. Bringman S, Conze J, Cuccurullo D, et al. Hernia repair: the search for ideal meshes. Hernia. 2010;14(1):81-87.
5. Schug-Pass C, Jacob DA, Tannapfel A, Köckerling F. Absorbable tacks for mesh fixation in laparoscopic inguinal hernia repair: does mesh fixation technique affect tissue reaction? Surg Endosc. 2012;26(4):878-884.
6. Sajid MS, Bokhari SA, Mallick AS, et al. Needlescopic versus conventional laparoscopic inguinal hernia repair. Surg Endosc. 2009;23(4):835-845.
7. Champault GG, Bernard C, Rizk N, et al. Inguinal hernia repair: a prospective study of 1,416 cases. Hernia. 1996;2(1):45-48.
8. Tamme C, Scheidbach H, Hampe C, et al. Totally extraperitoneal endoscopic inguinal hernia repair (TEP). Ann Surg. 2003;238(5):761-769.
9. ABBAS, K. (2021). Post-operative pain and early complications in patients undergoing laparoscopic transabdominal preperitoneal inguinal hernia repair using mesh fixation with sutures versus tackers. Group, 1, 0-0001.

10. Pompeu, B. F., Almiron da Rocha Soares, G., Pereira Silva, M., Ponte Farias, A. G., Oliveira de Sousa Silva, R., & Mazzola Poli de Figueiredo, S. (2024). Suture versus tacks in minimally invasive transabdominal preperitoneal inguinal repair: a meta-analysis of randomized controlled trials. Surgical Endoscopy, 38(9), 4858-4868.
11. Ross, S. W., Oommen, B., Kim, M., Walters, A. L., Augenstein, V. A., & Todd Heniford, B. (2015). Tacks, staples, or suture: method of peritoneal closure in laparoscopic transabdominal preperitoneal inguinal hernia repair effects early quality of life. Surgical endoscopy, 29, 1686-1693.
12. Shetiwy, M., Fareed, A. M., Basheer, M., Albahy, A., Negm, A., & Shoma, A. M. (2022). Use of tissue adhesive versus staples for mesh fixation in laparoscopic TAPP inguinal hernioplasty. Surgery, Gastroenterology and Oncology, 27(3), 208.
13. Sajid, M. S., Ladwa, N., Kalra, L., Hutson, K., Sains, P., & Baig, M. K. (2012). A meta-analysis examining the use of tacker fixation versus no-fixation of mesh in laparoscopic inguinal hernia repair. International journal of surgery, 10(5), 224-231.
14. Wilson, P., & Hickey, L. (2019). Laparoscopic transabdominal preperitoneal (TAPP) groin hernia repair using n-butyl-2-cyanoacrylate (Liquiband® Fix8™) for mesh fixation and peritoneal closure: learning experience during introduction into clinical practice. Hernia, 23, 601-613.
15. Douissard, J., Meyer, J., Dupuis, A., Peloso, A., Mareschal, J., Toso, C., & Hagen, M. (2020). Robotic versus open primary ventral hernia repair: A randomized controlled trial (Robovent Trial). International journal of surgery protocols, 21, 27-31.
16. Alexandre, J. H., Amid, P. K., Campanelli, G., Champault, G., Chowbey, P. K., Corcione, F., ... & Zollinger, R. M. (2015). The World Journal of Hernia and Abdominal Wall Surgery.