

A Comparative Analysis of Tacker Versus Suture Mesh Fixation in Laparoscopic Repair of Inguinal Hernia

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Abstract

Background: Inguinal hernia is one of the most common general surgical procedures in the world. Laparoscopic repair has been more preferred due to less surgical discomfort, quicker recovery and better aesthetics result. Mesh fixing is a standard procedure that is usually performed with sutures or tackers. The type of fixation used could impact the surgery time, pain after surgery, recurrence or complication rate. The aim is to compare the results of laparoscopic inguinal hernia repair with the tackers mesh technique and suture meshes. **Material and Methods:** This prospective comparative study was performed during a period of 15 months and recruited 70 patients with inguinal hernia. Patients were randomly divided into 2 groups – Group A, tackers mesh fixation and Group B, suture mesh fixation. Demographic parameters, operating time, complications during the surgery, complications after the surgery, pain scores in the postoperative period, hospital stay and recurrence were recorded. The observed differences between the two groups was evaluated statistically to find if they are significant or not. **Results:** Operating time was significantly shorter for the tackers group than the suture group. The tackers group had less postoperative pain (measured by a visual analog scale) during the immediate postoperative period. There was no significant difference in the rates of recurrence and problems reported in the total between the two cohorts. Minor complications like the development of seroma and hematoma happened in a similar fashion. There was a slight reduction in the length of hospital stay in the tackers group that was not statistically significant. **Conclusion:** Inguinal laparoscopic hernia repair with tackers and with suture mesh is both safe and successful. Tackers fixation results in reduced operating time and reduced pain in the early postoperative period without increasing the rates of complications or recur. The results support the use of tackers devices as a potential alternative to sutures, particularly in situations where surgical efficiency and patient comfort are critical.

Keywords: Inguinal hernia, Laparoscopic repair, Mesh fixation, Postoperative pain, Tacker, Suture.

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INTRODUCTION

Inguinal hernia does not happen in only a small number of people and the risk is about 27% in males and 3% in females during their life time.^[1,2] It occurs when the contents of the abdomen bulge through a defect in the inguinal canal, usually in the form of a bulge in the groin area that is painful or uncomfortable. Although many surgical options have been described during the years, the introduction of tension-free mesh repair has greatly reduced recurrence rate and postoperative complications.^[2] Mesh repair works through strengthening the posterior wall of the inguinal canal, providing a strong and tension-free repair for the hernia defect.^[3]

Laparoscopic inguinal hernia repair, initiated in the early 1990s, has developed into a minimally invasive substitute for surgical repair, providing numerous benefits like diminished postoperative pain, abbreviated hospital stays, expedited resumption of normal activities, and enhanced esthetic results.^[4]

Both of these laparoscopic techniques involve the use of a synthetic mesh to close the hernia defect, which requires fixation to prevent mesh migration and recurrence.^[5] Several methods of mesh fixation including sutures, tackers, or fibrin sealants may be used and each technique has advantages and

disadvantages.^[6]

A traditional method is the use of suture fixation of the mesh using either non-absorbable or absorbable sutures. It is low-cost and readily used by surgeons, but requires a significant amount of time and may require great laparoscopic skill.^[7]

When using tackers fixation, however, mechanical devices are used to quickly and evenly attach the mesh. With tackers, the operation can be more efficient and reduce its duration, particularly in complicated anatomical locations, as well as making the fixing procedure easier. There have been concerns, however, about potential long-term pain and nerve irritation or injury to occur during the deployment of the tackers.^[8,9]

Many studies have analyzed different techniques of mesh fixation in the inguinal region for laparo-lifts and have concluded

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that there is no advantage to any specific technique. There are some studies suggesting that tackers reduce the duration of operation and early postoperative discomfort, and other studies suggesting that there are no meaningful differences in long-term recurrence or complication rates. A thorough understanding of these differences is essential for better patient outcomes as the choice of fixation could impact the surgical experience and recovery.^[10,11]

Although laparoscopic surgery is becoming popular, there is no consensus on the best method of attachment of the mesh. The choice of fixation system must take into account factors such as the length of the operation, postoperative pain, the incidence of complications, cost and patient satisfaction. Comparative study can be beneficial to understanding these respective advantages and limitations, respectively, of the tacker or suture fixation method, which can be helpful for surgeons to make evidence-based decisions.

The purpose of this study is to determine and compare the effectiveness, safety and outcomes of tacker versus suture mesh fixation in the laparoscopic repair of inguinal hernias. The goal of this study is to add data to an existing data pool that can be used to guide surgical practice and improve patient care for minimally invasive hernia repair surgery, such as data for operative time, postoperative pain, complications, hospital length of stay, and morbidities.

Aims and Objectives: To compare the outcomes of tacker mesh fixation versus suture mesh fixation in laparoscopic inguinal hernia repair.

MATERIALS AND METHODS

This was a Prospective Comparative study in the Department of General surgery at Sree Mookambika Institute of Medical Sciences, Kulasekharam during 15 months. Patients included in the study were those with unilateral and bilateral inguinal hernias who were undergoing elective laparoscopy. To limit the study population, patients with comanidities, such as uncontrolled diabetes or cardiovascular disease, were excluded, as were those with preexisting lower abdominal surgeries, coagulopathy, and complicated hernias, as well as recurrent hernias.

The total number of patients enrolled was 70, and they were randomly divided into two groups: the first performed mesh fixation with tacker, and the second performed mesh fixation

with laparoscopic sutures. All patients gave informed consent and the study protocol was approved by the institutional ethics committee.

Intensive history, examination, routine laboratory and imaging studies were performed preoperatively. Surgery was performed by experienced laparoscopic surgeons to minimize inter-operator variability and under general anaesthetic.

Both groups were treated by the surgeon's choice and anatomical criteria, using the transabdominal preperitoneal (TAPP) or totally extraperitoneal (TEP) approach. Once pneumoperitoneum and laparoscopic access was obtained, the hernia defect was located, reduced and a polypropylene mesh secured to cover the defect with an appropriate overlap. For the Group A, mechanical tacker devices were used for the mesh fixation at pre-defined points and in the Group B, the fixation was achieved by laparoscopic sutures.

All patients were entered in the operative time, intraoperative complications, and technical difficulties in the data excepted for intraoperatively. The postoperative outcome parameters were pain scores on the Visual Analog Scale (VAS) at 6, 12 and 24 hours after surgery, duration of hospitalization and complications of surgery, including seroma, hematoma and wound infection. At one week, one month, three months and six months after surgery, patients were re-assessed for chronic pain, recurrence and patient satisfaction.

All data were analyzed statistically with the SPSS version 20.0, continuous variables were presented as mean $\pm$ SD and categorical variables as percentages (%). The continuous variables were compared between the two groups using the Student's t-test and categorical variables were compared using the Chi-square Test. The p value < 0.05 was taken as statistically significant.

RESULTS

The present study included 70 patients diagnosed with inguinal hernia who underwent laparoscopic repair with either tacker mesh fixation (Group A, n = 35) or suture mesh fixation (Group B, n = 35). The demographic characteristics, operative details, and postoperative outcomes were analyzed and compared between the two groups. Both groups were comparable in terms of age, gender, and laterality of hernia, with no statistically significant differences. [Table 1]

Table 1: Demographic Profile of Patients (n = 70)

Parameter	Group A (Tacker) n (%)	Group B (Suture) n (%)	p-value
Age (years)			0.78
20-30	6 (17.1)	5 (14.3)	
31-40	10 (28.6)	9 (25.7)	
41-50	12 (34.3)	13 (37.1)	
>50	7 (20.0)	8 (22.9)	
Gender			0.64
Male	30 (85.7)	31 (88.6)	
Female	5 (14.3)	4 (11.4)	
Side of Hernia			0.55
Right	18 (51.4)	17 (48.6)	
Left	14 (40.0)	15 (42.9)	
Bilateral	3 (8.6)	3 (8.6)	

The distribution of hernia types was similar in both groups, ensuring comparable operative challenges. [Table 2]

Table 2: Type of Hernia

Type	Group A n (%)	Group B n (%)	p-value
Indirect	22 (62.9)	23 (65.7)	0.80
Direct	12 (34.3)	11 (31.4)	0.77
Pantaloon	1 (2.8)	1 (2.9)	0.99

The tacker group had significantly shorter operative times compared to the suture group. Intraoperative complications

were minimal and comparable. [Table 3]

Table 3: Operative Parameters

Parameter	Group A (Tacker)	Group B (Suture)	p-value
Mean operative time (minutes)	52.3 ± 7.5	68.7 ± 9.2	<0.001*
Intraoperative complications	1 (2.8%)	2 (5.7%)	0.55

Postoperative pain was significantly lower in the tacker group at 6 and 12 hours. By 24 hours, the difference was not statistically significant. [Table 4] Postoperative

complications were minor and comparable between the two groups. No recurrences were observed during the 6-month follow-up. [Table 5]

Table 4: Postoperative Pain (VAS Score)

Time	Group A (Tacker)	Group B (Suture)	p-value
6 hours	3.2 ± 0.8	4.5 ± 1.0	<0.001*
12 hours	2.1 ± 0.6	3.0 ± 0.7	<0.001*
24 hours	1.5 ± 0.5	1.8 ± 0.6	0.08

Table 5: Postoperative Complications

Complication	Group A	Group B	Total
Seroma	2 (5.7)	3 (8.6)	5 (7.1)
Hematoma	1 (2.8)	2 (5.7)	3 (4.3)
Wound infection	0 (0)	1 (2.8)	1 (1.4)
Chronic pain (>3 months)	1 (2.8)	2 (5.7)	3 (4.3)
Recurrence (6 months follow-up)	0 (0)	0 (0)	0 (0)

The length of hospital stay was slightly shorter in the tacker group, though the difference was not statistically significant.

[Table 6]

Table 6: Length of Hospital Stay

Parameter	Group A (Tacker)	Group B (Suture)	p-value
Mean stay (days)	1.8 ± 0.6	2.1 ± 0.7	0.07

DISCUSSION

Demographic factors (age, sex, and site of hernia: right vs. left) did not differ between the two groups. The most common age group was the 40 to 50 year olds, which conforms to the known epidemiology of inguinal hernia. There was no significant difference in the distribution of right-, left-, or bilateral hernias in the groups, so as to minimize selection bias. There were more indirect, and then direct, and then pantaloon, in keeping with the usual incidence rates.

The present study found an operation time of only 52.3 ± 7.5 minutes in the tacker fixation group compared with 68.7 ± 9.2 minutes in the suture fixation group (p < 0.001). This is similar to this data of Jayachandra S et al,^[12] which recorded the mean surgery durations at 51.4 min and 73.6 min for tacker fixation and suture fixation respectively (p < 0.05). Kumar A et al,^[13] observed a markedly reduced fixing time using tackers (17.2 ± 2.86 min) in contrast to sutures (49.4 ± 7.83 min; p < 0.0001). The expedited fixation procedure with tackers is due to their straightforward application, which is especially beneficial in laparoscopic environments where intracorporeal suturing poses technical challenges. Surgical

duration reduction has clinical and economic implications, such as reduced exposure to anesthetic and improved OR efficiency. Assessment of postoperative pain showed significantly lower VAS scores in the tacker group at 6 and 12 hrs (p < 0.001), pain scores were similar in both groups at 24 hrs. The first pain decrease could be due to the less invasive nature of the mechanical tacker application of the tack to the tissues compared to suturing.

The findings are consistent with study done by Nahid AK et al,^[14] who showed that there were higher mean postoperative pain scores in tacker group (7.12 ± 1.13) than in non-fixation group (4.91 ± 1.23) with p < 0.001. However, Aziz SS et al,^[15] showed a difference among trials with higher mean pain scores among the tacker fixation group (4.88 ± 0.887 at 6 hours and 5.29 ± 0.777 at 24 hours) than those of suture fixation (3.43 ± 0.962 at 6 hours, and 4.11 ± 0.703 at 24 hours, p < 0.001). However, overall the results suggest that fixation technique, mesh tension and tissue manipulation during surgery influence postoperative pain.

There were no significant differences in postoperative complications between groups. Incidence of seroma, hematoma, wound infection and chronic groin pain were very rare and did

not differ significantly. There is no recurrence in either cases up to six months of follow-up, showing both fixation methods lead to a permanent healing. Jayachandra S et al,^[12] also reported no recurrence or obstruction, while Nahid AK et al,^[14] state that the non-fixation group experienced a minor recurrence rate (2%) which was not statistically significant ($p > 0.05$). The results highlight that the fixation type does not significantly affect recurrence as long as there is sufficient mesh overlap and fixation.^[15]

The mean duration of hospital stay was marginally reduced in the tacker group (1.8 ± 0.6 days) relative to the suture group (2.1 ± 0.7 days), however this difference lacked statistical significance. Similar results were seen by Qazi M et al,^[16] indicating mean hospital stays of 2.6 ± 1.3 days for tacker fixation and 2.8 ± 1.3 days for suture fixation ($p = 0.4$). The marginally accelerated discharge trend in the tacker group may indicate the synergistic impact of diminished operating duration and decreased early postoperative discomfort.

Economic and practical factors are equally essential in the choosing of techniques. Mohamed Amer HA et al,^[17] highlighted that intracorporeal suturing is more cost-effective and accessible than tacker devices, which are expensive and less available in resource-constrained environments. Likewise, Shankaran R et al,^[18] documented markedly reduced VAS pain levels using barbed sutures in comparison to tackers, even though the latter provided expedited fixation. Consequently, although tackers provide technical convenience and time efficiency, suturing remains a cost-effective and broadly applicable alternative that does not compromise safety or long-term results.

This study confirms that both tacker and suture fixation methods are safe and effective for laparoscopic inguinal hernia repair. Tacker fixation has the benefits of decreased operating duration and diminished early postoperative discomfort, although suture fixation remains a practical, cost-effective, and comparably robust alternative. Surgeon experience, patient comfort, and institutional financial limitations should all be taken into account when choosing between various approaches.

CONCLUSION

Both tacker and suture mesh fixation procedures were determined to be safe, effective, and linked to low complication and recurrence rates. Tacker fixation provided the benefits of markedly reduced operating duration and diminished early postoperative discomfort, hence improving patient comfort and possibly accelerating recovery. Suture fixation continues to be a dependable option, especially in budget-conscious environments. The study supports the utilization of tacker devices as a viable and efficient approach for mesh attachment in laparoscopic inguinal hernia repair, ensuring safety and favorable long-term outcomes.

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Conflicts of interest

There are no conflicts of interest.

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