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A Comparative Study of Vicryl Suture vs Titanium Tacker in Peritoneum Closure in TAPP Cases

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ABSTRACT

Background: A successful hernia surgery aims to minimize recurrence rates, enhance comfort of patients and hasten a timely return towards daily life activities. This study compares the effectiveness of titanium tackers against Vicryl sutures for closing the peritoneum during laparoscopic inguinal hernia repair during Transabdominal Preperitoneal (TAPP) procedures.

Methods: The study was designed as a prospective comparative study that was conducted at the Department of General Surgery, Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, Bihar, India. The study included 30 patients diagnosed with uncomplicated inguinal hernia. Participants were further randomized into two groups equally among which one group received intracorporeal suturing using vicryl sutures, while the other group underwent the procedure using titanium tackers. Outcomes measured included duration of surgery, postoperative pain, infections at surgical sites, seroma formation, and duration of hospitalization.

Results: The findings revealed that the mean surgical duration was notably longer in the Suture Group 99.7±9.8 minutes compared to the Tacker Group at 78.3±8.1. Postoperative pain was lower in the Suture Group, with patients reporting less severe discomfort. Discharge from the hospital was earlier in the Tacker Group, notwithstanding the absence of statistical significance. Both groups exhibited similar rates of surgical site infections and seroma formation, with no significant differences in postoperative complications observed.

Conclusion: The study concluded that while titanium tackers were associated with reduced operative time, vicryl sutures led to lower postoperative pain and comparable complication rates. Nonetheless, further research employing larger sample sizes is warranted to ascertain the optimal peritoneal closure method for TAPP procedures.

Keywords: *Laparoscopy, Postoperative complications, Hernia, Inguinal, Surgical mesh*

1. INTRODUCTION

Among primary care providers, inguinal hernia repair is the most common surgically related ailment. Due to its excessive rate, it has been reported that almost 20 million repairments of groin hernia is performed every year across the globe. In the military, inguinal hernia is observed to be the prevalent condition that ranks fourth, which might affect medical personnel [1].

In the contemporary landscape of advanced healthcare, hernia surgeries represent a prevalent procedure within the repertoire of general surgeons. A successful hernia surgery aims to minimize recurrence rates, optimize patient comfort, and expedite a prompt return to regular activities [2, 3]. Both the transabdominal preperitoneal (TAPP) and extraperitoneal (TEP) repair were considered the two most often utilized procedures of laparoscopy for the repair of inguinal hernia [4].

Laparoscopic hernia repair demonstrates superior outcomes in accomplishing these objectives in comparison with conventional open surgery [5, 6]. The laparoscopic approach offers distinct advantages such as improved aesthetic results, reduced postoperative discomfort, diminished hospitalization periods, and accelerated recovery [5, 6, 7].

However, a persistent challenge lies in identifying the most effective technique for peritoneal closure utilizing either mesh or tackers. Despite numerous studies exploring the advantages of various peritoneal closure methods, a consensus remains elusive. Employing sutures for peritoneal closure can be intricate and time-intensive [8].

This research endeavors to assess the efficacy of tackers versus sutures for peritoneal closure and mesh fixation following laparoscopic TAPP inguinal hernia surgery, to add perspective to this continuing discussion.

2. METHODOLOGY

Study Design- The study was designed as a prospective comparative study that took place at the Department of General Surgery, Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, Bihar, India. The study was conducted for one year, i.e., from August 2022 to July 2023.

Study Population- The study involved the recruitment of 30 patients diagnosed with uncomplicated inguinal hernia and seeking treatment at the Department of General Surgery, IGIMS, Patna, Bihar, India. And, the exclusion criteria encompassed patients who declined participation, individuals unable to withstand general anesthesia, those with complicated hernias, untreated lower urinary tract symptoms (LUTS) and constipation, and patients with immunocompromised conditions. The selected patients were further assigned equally into two groups. One group of patients underwent intracorporeal suturing using vicryl sutures to secure the mesh and close the peritoneal flaps, while the other group underwent the same procedure using titanium tackers.

Data Collection- Informed consent was obtained from all participants. Uniform pro-lene meshes were utilized for all patients, and the same surgical team performed the surgical procedures. Patients were discharged upon stabilization of vital signs, ability to tolerate oral intake, and absence of requirement for parenteral analgesics. Those patients who requested early discharge received counseling regarding discharge instructions before being discharged. The study compared the two groups based on parameters such as duration of surgery, postoperative pain, infection at the surgical site, seroma formation, and duration of hospital stay.

Statistical Analysis- To conduct the statistical analysis, SPSS version 24 was utilized. Either mean±SD or n (%) were used to display the data. To determine the p-value, a statistical method such as the independent t-test or chi-square test was employed. When the P-value was less than 0.05, it was deemed to be significant.

Ethical Clearance- Approval of ethics has been granted by the institutional ethical committee (IEC), IGIMS, Patna, Bihar, India, under letter 576/IEC/IGIMS/2022, dated 18 July 2022.

Results

Table 1 depicts the characteristics of enrolled participants. Thirty cases of simple inguinal hernias were considered to be included in this investigation. Their average age was 40.8±7.5 years in the suture group and 42.6±7.2 years in the tacker group. The duration of surgery was significantly longer in the suture group at 99.7±9.8 minutes compared to the tacker group with 78.3±8.1.

Table 1. Patients Demographics

Characteristics	Suture Group (n=15)	Tacker Group (n=15)	P-Value
Age (in years)	40.8±7.5	42.6±7.2	0.46
Duration of Surgery (in minutes)	99.7±9.8	78.3±8.1	**<0.0001**
Patients Discharge (on days)			
POD1	00 (0%)	01 (6.7%)	0.08
POD2	07 (46.7%)	10 (66.7%)	

POD3	03 (20%)	04 (26.7%)	
POD4	05 (33.3%)	00 (0%)	

Data was represented as either mean±SD or n (%)

A chi-squared or independent t-test was employed to get the p-value

A P-value of less than 0.05 was deemed significant.

Table 2 shows pain observed in participants. Pain levels on POD 1 show that most of the patients in the Suture group 10 (66.7%) experience mild pain, while the Tacker Group has a higher proportion of patients reporting moderate pain 09 (60.0%). Compared to the Suture Group 01 (6.6%), the Tacker Group 02 (13.3%) has a higher prevalence of severe discomfort.

Table 2. Pain Observed in Participants

Severity of Pain	Suture Group (n=15)	Tacker Group (n=15)	P-Value
Mild	10 (66.7%)	04 (26.7%)	0.08
Moderate	04 (26.7%)	09 (60%)	
Severe	01 (6.6%)	02 (13.3%)	

Data was represented as n (%)

The p-value was obtained using the chi-square test

A P-value of less than 0.05 was deemed significant

Postoperative complications were assessed in the 1st, 2nd, and 3rd months following surgery. There was no statistical difference observed among overall complication rates, including Surgical Site Infections (SSI), minor SSI, major SSI, and seroma formation. Both groups demonstrated a low incidence of major SSIs. At the 3rd month, there were no complications observed in the tacker group. Table 3 shows various post-operative complications among participants at different follow-up periods.

Table 3. Post-operative Complications observed in Participants

Post-operative complications		At 1st Month	At 2nd Month	At 3rd Month
Surgical site Infections (SSI)	Suture Group	13 (86.7%)	14 (93.3%)	15 (100%)
	Tacker Group	12 (80%)	13 (86.7%)	00 (0%)
Minor SSI	Suture Group	01 (6.7%)	00 (0%)	00 (0%)
	Tacker Group	02 (13.3%)	01 (6.7%)	00 (0%)
Major SSI	Suture Group	00 (00%)	00 (0%)	00 (0%)
	Tacker Group	01 (6.7%)	01 (6.7%)	00 (0%)
Seroma Formation	Suture Group	01 (6.7%)	01 (6.7%)	00 (0%)
	Tacker Group	00 (00%)	00 (0%)	00 (0%)
P-Value		0.499	0.386	-

Data was represented as n (%)

The p-value was obtained using the chi-square test

A P-value of less than 0.05 was deemed significant

3. DISCUSSION

The formation of peritoneal flaps is essential for decreasing the sac of the hernia and creating space in the plane of preperitoneal during TAPP surgery of laparoscopic groin hernia. In order to minimize adhesions, avoid internal herniation into the preperitoneal region, and shield the mesh from exposure to abdominal viscera, mesh fixation must be followed by the closure of the peritoneal defect [9]. There are several ways to close peritoneal defects, including mechanical approaches that use staples, clips, and tackers. These treatments have risks of nerve damage, insufficient closure, peritoneal flap tearing, and herniation at the tacking site [10, 11].

According to a study conducted in 2013, Kitamura et al. found that there was no significant difference in the level of pain in the groups that had suture and peritoneal closure with tacker [12]. A 2011 study by Bansal et al. comparing suture closure to tacker procedures found that the suture group suffered noticeably less discomfort than the tacker group. The suture group's operating time was noticeably longer, though. At a one-month follow-up, the suture group also experienced much less postoperative discomfort [13]. Ross et al. in 2016 depicted that the group of sutures had more discomfort than the tacker group. Long-term groin pain was observed in the tacker group, which resolved upon removal of the tackers [7]. Both studies indicated comparable rates of postoperative infections between the two groups.

Due to the technical demands of suturing, the suture group's operational time was longer, which is consistent with earlier research. Patients in the suture group experienced less immediate pain post-operatively and resumed their regular activities sooner. There was a shorter return to normal activities and higher postoperative discomfort in the tacker group, with several patients experiencing extreme pain. Rates of seroma formation and surgical site infection (SSI) were comparable in both groups, and the majority of patients were released by the second postoperative day.

Recognizing the limitations of our study, such as its small sample size and short follow-up period, is essential. For future research to make definitive findings regarding the optimal strategy between suture and tacker fixation, larger sample sizes and longer follow-up periods are required.

4. CONCLUSION

This comparative study on peritoneum closure in TAPP cases using vicryl sutures versus titanium tackers underscores important considerations in surgical practice. Although titanium tackers shorten the duration of surgery, they are linked to severe postoperative pain right away and a delayed return to regular activities. vicryl sutures, on the other hand, cause similar rates of surgical site infections and sequelae and less postoperative discomfort. There were no appreciable variations in the postoperative complications at one or two months between the two methods, which showed comparable safety profiles. To make more firm recommendations regarding the best peritoneal closure technique for laparoscopic groin hernia repair, more research with bigger cohorts and longer follow-up is necessary.

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