



Original Article

Role of Subcutaneous Tissue Closure in Elective Inguinal Hernia Repair: A Comparative Study of Early Wound Outcomes

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Received: 26-06-2026

Accepted: 05-07-2026

Available online: 20-07-2026

ABSTRACT

Introduction: The necessity of subcutaneous tissue closure during elective inguinal hernia repair remains controversial. While suturing the subcutaneous layer may reduce dead space and postoperative wound complications, it may also increase operative time, tissue ischemia, and postoperative pain. Evidence specific to elective inguinal hernia surgery is limited, necessitating further evaluation. **Aim and Objectives:** To compare postoperative wound outcomes in patients undergoing elective inguinal hernia repair with and without subcutaneous tissue closure. The study also aimed to evaluate postoperative pain, wound-related complications, duration of hospital stay, and patient satisfaction between the two techniques. **Materials and Methods:** This hospital-based interventional study was conducted in the Department of General Surgery, Muzaffarnagar Medical College and Hospital, Uttar Pradesh. Sixty patients undergoing elective mesh repair for inguinal hernia were randomly allocated into two equal groups: Group A underwent subcutaneous tissue closure with 2-0 Vicryl, while Group B underwent no subcutaneous tissue closure. Patients were followed for six months to assess postoperative pain using the Visual Analogue Scale (VAS), wound complications (seroma, hematoma, wound infection, and dehiscence), duration of hospital stay, and patient satisfaction. Statistical analysis was performed using SPSS version 26, with $p < 0.05$ considered statistically significant. **Results:** Baseline demographic and clinical characteristics were comparable between the two groups ($p > 0.05$). The mean operative time and hospital stay did not differ significantly. Patients in the non-sutured group experienced significantly lower postoperative pain on postoperative day 3 (VAS: 4.00 ± 1.06 vs. 4.67 ± 1.01 ; $p = 0.017$). Early postoperative wound complications occurred in 6.67% of the sutured group and 10.00% of the non-sutured group, although this difference was not statistically significant ($p = 0.640$). No additional wound-related complications were observed during the six-month follow-up. Patient satisfaction was high and comparable in both groups. **Discussion:** The findings suggest that omission of subcutaneous tissue closure does not increase postoperative wound complications following elective inguinal hernia repair. Although subcutaneous closure was associated with a slightly lower incidence of early wound complications, the difference was not statistically significant. Conversely, patients without subcutaneous closure experienced significantly less postoperative pain during the early recovery period, supporting the selective omission of this surgical step in low-risk patients. **Conclusion:** Routine subcutaneous tissue closure during elective inguinal hernia repair does not provide a significant advantage in reducing postoperative wound complications. Non-closure offers comparable wound outcomes with lower early

postoperative pain and may therefore be considered a safe and effective alternative in appropriately selected patients. Larger multicenter randomized studies are warranted to validate these findings.

Keywords: *Elective inguinal hernia repair; Subcutaneous tissue closure; Wound healing; Surgical site complications; Postoperative pain; Hernioplasty.*

INTRODUCTION

Inguinal hernia repair is one of the most commonly performed elective surgical procedures worldwide [1]. Although advances in surgical techniques have improved patient outcomes, the optimal method of wound closure remains a subject of debate [2-3]. Traditionally, the subcutaneous tissue is sutured to eliminate dead space, reduce the risk of seroma and hematoma, decrease skin tension, and promote better wound healing. However, some surgeons argue that suturing the poorly vascularized subcutaneous fat may increase tissue ischemia, prolong operative time, and introduce foreign material that could increase the risk of infection [4–7].

Several studies have evaluated subcutaneous tissue closure in abdominal, gynecological, and obstetric surgeries, but the results remain inconsistent. While some studies have reported no significant difference in wound complications between sutured and non-sutured wounds, others have demonstrated lower rates of seroma, hematoma, and surgical site infection with subcutaneous closure, particularly in obese patients or those with thicker subcutaneous tissue [8–12]. A Cochrane systematic review also concluded that the available evidence is insufficient to recommend either routine closure or non-closure of the subcutaneous layer in non-caesarean surgeries [11].

Elective inguinal hernia repair is considered a clean surgical procedure with a relatively low risk of wound infection. Nevertheless, postoperative complications such as seroma, hematoma, wound dehiscence, and postoperative pain can delay recovery, prolong hospital stay, and affect patient satisfaction [13–14]. Despite the large number of inguinal hernia repairs performed worldwide, evidence regarding the role of subcutaneous tissue closure in these procedures remains limited [15–16].

Therefore, the present study was undertaken to compare postoperative wound outcomes in patients undergoing elective inguinal hernia repair with and without subcutaneous tissue closure. The study aimed to evaluate wound healing, postoperative complications, pain, duration of hospital stay, and patient satisfaction, thereby providing evidence on whether routine subcutaneous tissue closure offers additional clinical benefit in elective inguinal hernia surgery.

AIM AND OBJECTIVES

Aim

To compare postoperative wound outcomes in patients undergoing elective inguinal hernia repair with and without subcutaneous tissue closure.

Objectives

- To compare wound healing following elective inguinal hernia repair in patients with and without subcutaneous tissue closure.
- To compare the incidence of postoperative wound complications, including seroma, hematoma, surgical site infection, and wound dehiscence, between the two groups.
- To compare postoperative pain, duration of hospital stay, and patient satisfaction between patients with and without subcutaneous tissue closure.

MATERIALS AND METHODS

Study Design

This study was designed as a hospital-based interventional study.

Study Setting

The research was conducted at the Department of General Surgery, Muzaffarnagar Medical College and Hospital, Muzaffarnagar, Uttar Pradesh.

Study Duration

The total duration of the study was 18 months, which included 12 months for data collection and 6 months for data compilation and analysis.

Study Population

All patients undergoing elective inguinal hernia surgery at the institute during the study period were considered for inclusion.

Sample Size

A total of 60 patients were enrolled for the study. The sample size was determined based on the average number of elective inguinal hernia surgeries performed at the hospital over a three-year period.

Sampling Technique and Grouping

Patients were randomly allocated into two groups:

Group A: Patients who underwent mesh repair in elective inguinal hernia surgery, in whom the subcutaneous tissue was sutured using 2-0 Vicryl.

Group B: Patients who underwent mesh repair in elective inguinal hernia surgery, in whom the subcutaneous tissue was not sutured.

Inclusion Criteria

- Patients undergoing elective inguinal hernia surgery.
- Patients aged more than 10 years and less than 60 years.
- Patients who provided informed written consent for participation.

Exclusion Criteria

- Patients in whom mesh repair was not performed.
- Obese patients.
- Patients with hematological disorders, long-term anticoagulation therapy, coagulation disorders, malignancy, diabetes mellitus, or septicemia.
- Patients with impaired renal, hepatic, or cardiac function.
- Patients are younger than 10 years or older than 60 years.
- Patients on chemotherapy or radiotherapy.

Data Collection and Statistical Analysis

Data were compiled and analyzed using SPSS version 26. Categorical variables were presented as frequency and percentages and analysed using Chi square test. Continuous variables were presented as Mean and SD and analysed using independent t test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Comparison of Age Distribution Between the Sutured and Non-Sutured Groups

Table 1: Comparison of Age Distribution Between the Sutured and Non-Sutured Groups

Age	Group A (Sutured)		Group B (Not sutured)	
	Frequency	Percentage	Frequency	Percentage
20-30 years	6	20.00%	7	23.33%
31-40 years	8	26.67%	9	30.00%
41-50 years	8	26.67%	7	23.33%
51-60 years	8	26.67%	7	23.33%
Total	30	100.00%	30	100.00%
p-value	0.9657			

The age distribution was comparable between the two groups, with no statistically significant difference ($p = 0.9657$). The mean age was 41.67 ± 9.54 years in the sutured group and 39.93 ± 7.67 years in the non-sutured group, indicating that both groups were well matched with respect to age (table 1).

Comparison of Gender Distribution Between the Sutured and Non-Sutured Groups

Table 2: Comparison of Gender Distribution Between the Sutured and Non-Sutured Groups

Gender	Group A (Sutured)		Group B (Not sutured)	
	Frequency	Percentage	Frequency	Percentage
Male	28	93.33%	29	96.67%
Female	2	6.67%	1	3.33%
p-value	0.5536			

The majority of patients in both groups were male. Gender distribution was comparable between the sutured and non-sutured groups, with no statistically significant difference ($p = 0.5536$), indicating that the two groups were well matched at baseline (table 2).

Body Mass Index (BMI) Distribution of the Study Participants

Table 3: Body Mass Index (BMI) Distribution of the Study Participants

BMI (kg/m ²)	Group A (Sutured)	Group B (Not sutured)
Mean	22.82	21.90
SD	2.64	3.07
p-value	0.2278	

The baseline BMI was similar in both groups, with no statistically significant difference ($p = 0.2278$). The mean BMI was 22.82 ± 2.64 kg/m² in the sutured group and 21.90 ± 3.07 kg/m² in the non-sutured group (table 3).

Side of Inguinal Hernia Among the Study Participants

Table 4: Side of Inguinal Hernia Among the Study Participants

Side of Hernia	Group A (Sutured)		Group B (Not sutured)	
	Frequency	Percentage	Frequency	Percentage
Right	19	63.33%	12	40.00%
Left	5	16.67%	9	30.00%
Bilateral	6	20.00%	9	30.00%
p-value	0.1898			

Right-sided inguinal hernia was the most common presentation in both groups. Although the proportions of right-, left-, and bilateral hernias varied slightly between the groups, the difference was not statistically significant ($p = 0.1898$), indicating a comparable distribution of hernia laterality (table 4).

Comparison of Direct and Indirect Inguinal Hernias Between the Two Groups

Table 5: Comparison of Direct and Indirect Inguinal Hernias Between the Two Groups

Type of Hernia	Group A (Sutured)		Group B (Not sutured)	
	Frequency	Percentage	Frequency	Percentage
Direct	12	40.00%	14	46.67%
Indirect	18	60.00%	16	53.33%
p-value	0.6023			

Indirect inguinal hernia was the most common type in both groups. No significant difference was observed in the distribution of hernia type between the sutured and non-sutured groups ($p = 0.6023$) (table 5).

Comparison of Operative Time Between the Study Groups

Table 6: Comparison of Operative Time Between the Study Groups

Duration of Surgery (min)	Group A (Sutured)	Group B (Not sutured)
Mean	62.43	61.50
SD	7.27	8.72
p-value	0.6597	

No significant difference was observed in the duration of surgery between the sutured and non-sutured groups ($p = 0.6597$), suggesting that subcutaneous tissue closure had no measurable impact on operative time. (table 6).

Postoperative Pain Assessment Using Visual Analogue Scale (VAS)

Table 7: Postoperative Pain Assessment Using Visual Analogue Scale (VAS)

VAS score	Group A (Sutured)		Group B (Not sutured)		p-value
	Mean	SD	Mean	SD	
POD 1	7.03	1.08	6.93	1.09	0.7273
POD 3	4.67	1.01	4.00	1.06	0.0175
POD 7	2.77	3.46	1.87	0.72	0.1756

Postoperative pain scores declined progressively in both groups during follow-up. Pain was comparable on postoperative days (POD) 1 and 7 ($p > 0.05$). However, patients in the non-sutured group reported significantly lower pain scores on POD 3 than those in the sutured group ($p = 0.0175$).

Incidence of Postoperative Wound Complications During Follow-up

Table 8: Incidence of Postoperative Wound Complications During Follow-up

Complications	Group A (Sutured)		Group B (Not sutured)		p-value
	Frequency	Percentage	Frequency	Percentage	
1st week	2	6.67%	3	10.00%	0.6404
2nd week	0	0.00%	0	0.00%	-
3rd week	0	0.00%	0	0.00%	-
1st month	0	0.00%	0	0.00%	-
2nd month	0	0.00%	0	0.00%	-
3rd month	0	0.00%	0	0.00%	-
4th month	0	0.00%	0	0.00%	-
5th month	0	0.00%	0	0.00%	-
6th month	0	0.00%	0	0.00%	-

Postoperative wound complications were observed only during the first postoperative week. Although the incidence was slightly higher in the non-sutured group than in the sutured group, the difference was not statistically significant ($p = 0.6404$). No wound complications were recorded in either group during the subsequent follow-up period of six months (Table 8).

Duration of Hospital Stay in the Sutured and Non-Sutured Groups

Table 9: Duration of Hospital Stay in the Sutured and Non-Sutured Groups

Duration of Hospital Stay (days)	Group A (Sutured)	Group B (Not sutured)
Mean	5.80	5.60
SD	1.05	1.05
p-value	0.4707	

The mean hospital stay was marginally longer in the sutured group than in the non-sutured group; however, the difference was not statistically significant ($p = 0.4707$), suggesting comparable postoperative recovery in both groups (table 9).

Patient Satisfaction Following Elective Inguinal Hernia Repair

Table 10: Patient Satisfaction Following Elective Inguinal Hernia Repair

Patient satisfaction	Group A (Sutured)		Group B (Not sutured)	
	Frequency	Percentage	Frequency	Percentage
Satisfied	28	93.33%	27	90.00%
Neutral	2	6.67%	3	10.00%
Dissatisfied	0	0.00%	0	0.00%
p-value	0.6404			

Overall patient satisfaction was comparable between the two groups, with most patients expressing satisfaction and no reports of dissatisfaction. The difference in satisfaction levels was not statistically significant ($p = 0.6404$) (table 10).

DISCUSSION

Overall, the findings of the present study suggest that routine subcutaneous tissue closure during elective inguinal hernia repair does not offer a significant advantage in improving postoperative wound outcomes. Baseline demographic and clinical characteristics, including age, gender, BMI, hernia side, and hernia type, were comparable between the two groups, ensuring a reliable comparison of postoperative outcomes. No significant differences were observed in operative duration, postoperative wound complications, length of hospital stay, or patient satisfaction between patients who underwent subcutaneous tissue suturing and those in whom the subcutaneous layer was left unsutured. The only significant finding was a lower postoperative pain score on the third postoperative day in the non-sutured group, suggesting that omission of subcutaneous suturing may reduce tissue handling and the associated inflammatory response during the early phase of recovery [17].

These findings are consistent with those reported by Bawa et al. [8], who demonstrated that omission of subcutaneous tissue closure did not increase wound infection or dehiscence while reducing operative time and suture use. Similarly,

Bayrak et al. [9] found no significant differences in surgical site infection, wound dehiscence, or seroma formation between closure and non-closure groups in obese patients undergoing gynecological surgery. Dwivedi et al. [10] also observed that subcutaneous suturing did not significantly reduce wound complications despite increasing operative time. Furthermore, the Cochrane systematic review by Gurusamy et al. [11] concluded that the available evidence is insufficient to support or discourage routine subcutaneous tissue closure in clean non-caesarean surgeries. Although Husslein et al. [5] and Madathil et al. [12] reported certain benefits of subcutaneous closure in specific surgical settings, these findings were influenced by differences in patient characteristics, wound type, and surgical procedures. Moreover, evidence suggests that patients with obesity or increased subcutaneous fat thickness may derive greater benefit from subcutaneous closure because of the higher risk of seroma and surgical site complications [9,14].

Taken together, the present study supports a selective rather than routine approach to subcutaneous tissue closure in elective inguinal hernia surgery [18]. In uncomplicated patients with normal BMI and clean surgical wounds, omission of subcutaneous suturing appears to be a safe and effective alternative without compromising wound healing or patient satisfaction. Therefore, the decision to close the subcutaneous layer should be individualized based on patient-related risk factors, wound characteristics, and the surgeon's intraoperative judgment. Further large-scale, multicentric randomized controlled trials with longer follow-up are recommended to establish definitive evidence and refine clinical guidelines for subcutaneous wound closure in elective inguinal hernia repair [19-27].

CONCLUSION

The present study found that suturing and non-suturing of the subcutaneous tissue during elective inguinal hernia repair resulted in similar postoperative outcomes. Both groups were comparable at baseline, with no significant differences in operative time, wound complications, hospital stay, or patient satisfaction. Although patients in the non-sutured group reported less pain on the third postoperative day, this difference was not observed by the seventh postoperative day.

Overall, omitting subcutaneous tissue suturing did not compromise wound healing or increase postoperative complications. These findings suggest that routine subcutaneous closure may not be necessary in uncomplicated elective inguinal hernia repair, and the decision should be guided by individual patient characteristics and the surgeon's clinical judgment.

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