



A Comparative Study of Mesh Repair and Tissue Repair in the Management of Inguinal Hernia

¹Fayik Hilal, ²Mr. Ishfaq Ramzan, ³Dr. Wasim Qadir Kar, ⁴Dr. Amandeep Singh, ⁵Dr. Abhishek Gupta

¹Post-Graduate Student, Department of Operation Theatre and Anesthesia Technology, University School of Allied Health Sciences, Rayat Bahra University, Mohali, Punjab, India.

²Assistant Professor, Department of Operation Theatre and Anaesthesia Technology, University School of Allied Health Sciences, Rayat Bahra University, Mohali, Punjab, India.

³Associate Professor, Department of General Surgery, Kashmir Medical College, India.

⁴Dean, University School of Allied Health Sciences, Rayat Bahra University, Mohali, Punjab, India.

⁵Assistant Professor, HOD, Department of Operation Theatre and Anaesthesia Technology, University School of Allied Health Sciences, Rayat Bahra University, Mohali, Punjab, India

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ABSTRACT

Background: Inguinal hernia is one of the most common surgical conditions worldwide. Mesh repair has become the standard technique because of its lower recurrence rate; however, tissue repair remains an alternative in selected patients. This study compared the clinical outcomes of mesh repair and tissue repair in patients with uncomplicated inguinal hernia.

Materials and Methods: A prospective comparative study was conducted on 50 patients aged 18–65 years with primary uncomplicated inguinal hernia. Patients were randomly allocated into two groups: Group I (Mesh Repair, n=25) and Group II (Tissue Repair, n=25). Baseline demographic characteristics, operative time, postoperative pain (VAS), postoperative complications, recurrence, and patient satisfaction were compared. Statistical significance was considered at $P < 0.05$.

Results: Baseline demographic characteristics and hernia types were comparable between the two groups ($P > 0.05$). The mean operative time was significantly shorter in the mesh repair group (48.4 ± 6.5 minutes) compared with the tissue repair group (56.7 ± 7.3 minutes) ($P < 0.001$). Postoperative pain scores at 6, 24, and 48 hours were significantly lower in the mesh repair group ($P < 0.001$). Although

postoperative complications and recurrence were lower in the mesh repair group, these differences were not statistically significant ($P > 0.05$). Patient satisfaction was significantly higher in the mesh repair group ($P = 0.03$).

Conclusion: Mesh repair is a safe and effective technique for the management of uncomplicated inguinal hernia. It provides shorter operative time, reduced postoperative pain, and greater patient satisfaction while maintaining comparable complication and recurrence rates.

Keywords: Inguinal hernia, Mesh repair, Tissue repair, Lichtenstein repair, Postoperative pain, Recurrence.



INTRODUCTION

Inguinal hernia is one of the most common surgical conditions encountered worldwide and remains a major public health concern due to its high prevalence, associated morbidity, and significant healthcare costs. It occurs when intra-abdominal contents protrude through a weak area in the inguinal canal, resulting in a visible or palpable swelling in the groin. The condition is more common in males because of anatomical differences in the inguinal region, although females can also be affected. The lifetime risk of developing an inguinal hernia is estimated to be approximately 27% in men and 3% in women (**Primates P & Goldacre M J 1996**). Surgical repair is the only definitive treatment and is recommended to relieve symptoms, prevent complications such as incarceration and strangulation, and improve the patient's quality of life.

The surgical repair of inguinal hernias remains one of the oldest and most frequently performed operations in surgery, with ongoing debates regarding the optimal surgical technique to reduce recurrence, postoperative pain, and improve overall patient outcomes (**Smith SM et al 2022**). Historically non-mesh or tissue-based repairs were the standard surgical approach for inguinal hernias. Techniques such as the Bassini, Shouldice, and McVay repairs involved suturing native tissues to close the hernia defect. These methods, although effective, were associated with relatively higher rates of recurrence, postoperative pain due to tension on tissues, and longer recovery times (**Hentati H et al 2014**). The introduction of synthetic mesh materials in the 1950s revolutionized hernia surgery by providing a tension-free repair that significantly reduced the recurrence rates. Mesh repair techniques, especially the Lichtenstein tension-free mesh repair, have become the gold standard in many centers globally (**Lockhart K et al 2018**).

Despite improvements in tissue repair, recurrence remained a significant problem because these procedures depended on suturing tissues under tension (**Simons MP et al 2009**) (**Wantz GE 1989**). Excessive tension at the repair site often resulted in tissue ischemia, postoperative pain, wound disruption, and eventual recurrence of the hernia (**Read RC 1993**) (**Bellón JM et al 2001**). In addition, growing evidence suggested that many patients with inguinal hernias have underlying abnormalities in collagen metabolism and connective tissue strength, making tissue-only repairs less durable (**Henriksen NA 2013**) (**Lichtenstein IL et al 1989**). Recognition of these limitations led to the development of prosthetic mesh and the concept of "tension-free" hernia repair, which revolutionized modern hernia surgery (**Hernia Surge Group 2018**) (**Bittner R et al 2012**).

The purpose of the study was the comparison of mesh repair and tissue repair in the management of inguinal hernia

AIM OF THE STUDY

A comparative study of mesh repair and tissue repair in the management of inguinal hernia

OBJECTIVES OF THE STUDY

1. To evaluate the comparison of mesh repair and tissue repair in the management of inguinal hernia.
2. To assess and compare postoperative pain following mesh repair and tissue repair.
3. To compare postoperative outcome in both the groups.
4. To compare the patient satisfaction in both the groups.

MATERIALS AND METHODS

MATERIALS

The present study was conducted in the Department of Operation Theatre and Anaesthesia Technology, Shifa Hospital, Srinagar, J&K, Bharat after obtaining approval from the Institutional Ethics Committee.

A total of 50 patients aged 18–65 years, diagnosed with primary uncomplicated inguinal hernia, belonging to ASA Grade I and II, and scheduled for elective inguinal hernia repair were included in the study. The patients were randomly divided into two groups, with 25 patients in each group.



GROUP I (n = 25): Patients undergo Mesh Repair.

GROUP II (n = 25): Patients undergo Tissue Repair.

INCLUSION CRITERIA

- Patients aged between 18 and 65 years.
- Patients diagnosed with unilateral primary uncomplicated inguinal hernia.
- Patients belonging to ASA Grade I and II.
- Patients willing to participate and provide written informed consent.
- Patients posted for elective inguinal hernia surgery.

EXCLUSION CRITERIA

- Patients with recurrent inguinal hernia.
- Patients with bilateral, obstructed, strangulated, or incarcerated inguinal hernia.
- Patients with severe systemic illness (ASA Grade III or IV).
- Patients with coagulation disorders or on anticoagulant therapy.
- Patients with local infection at the operative site.
- Patients with known allergy to polypropylene mesh or suture materials.
- Patients refusing to participate in the study.

Preoperative Assessment

All patients were undergoing a detailed preoperative evaluation, including history taking, clinical examination, and routine investigations such as complete blood count, blood sugar, blood urea, serum creatinine, coagulation profile, ECG, and chest X-ray whenever indicated. Fitness for surgery and anaesthesia were assessed. Written informed consent was obtained from all participants. Patients received standard preoperative preparation according to institutional protocol.

Methodology

Patients were randomly allocated into two groups using a simple randomization method. All surgeries were performed under spinal or general anaesthesia according to the patient's clinical condition and the anesthesiologist's discretion.

In Group I, inguinal hernia repair was performed using the Lichtenstein tension-free mesh repair technique with polypropylene mesh. In Group II, inguinal hernia repair was performed using tissue repair (Bassini/Shouldice technique) without the use of mesh. All patients received standard postoperative care, antibiotics, and analgesics as per hospital protocol.

Patients were followed during the postoperative period and at scheduled follow-up visits to assess surgical outcomes.

The Following Parameters Were Recorded

1. Demographic variables such as age, gender, height, weight, BMI, occupation, and duration of symptoms.
2. Type of inguinal hernia.
3. Duration of surgery (operative time).
4. Postoperative pain assessed using the Visual Analogue Scale (VAS).
5. Postoperative complications such as wound infection, seroma, hematoma, urinary retention, and chronic groin pain.
6. Recurrence of inguinal hernia during the follow-up period.
7. Overall surgical outcome and patient satisfaction.



RESULT ANALYSIS

Table 1: Comparison of demographic variables in both the groups

Parameter	Group I (Mesh Repair) n=25	Group II (Tissue Repair) n=25	P-value
Age (years)	41.8 ± 10.4	43.2 ± 9.8	0.58
Weight (kg)	64.3 ± 8.5	66.2 ± 7.9	0.38
Height (cm)	163.8 ± 7.2	165.1 ± 6.8	0.47
BMI (kg/m ²)	24.1 ± 2.9	24.5 ± 3.1	0.61
Male	20 (80%)	19 (76%)	0.73
Female	5 (20%)	6 (24%)	0.73
ASA Grade I	10 (40%)	11 (44%)	0.77
ASA Grade II	15 (60%)	14 (56%)	0.77

The demographic characteristics of the study participants, including age, weight, height, BMI, gender, and ASA physical status, were compared between the Mesh Repair (Group I) and Tissue Repair (Group II) groups. The mean age of the patients was 41.8 ± 10.4 years in Group I and 43.2 ± 9.8 years in Group II. The difference in mean age between the two groups was not statistically significant (P = 0.58).

The mean height of the patients was 163.8 ± 7.2 cm in Group I and 165.1 ± 6.8 cm in Group II. The difference in height between the two groups was not statistically significant (P = 0.47).

The mean body weight of the patients was 64.3 ± 8.5 kg in Group I and 66.2 ± 7.9 kg in Group II. The difference in body weight between the two groups was not statistically significant (P = 0.38).

The mean BMI was 24.1 ± 2.9 kg/m² in Group I and 24.5 ± 3.1 kg/m² in Group II. The difference in BMI between the two groups was not statistically significant (P = 0.61).

Regarding gender distribution, 20 (80%) patients in Group I and 19 (76%) patients in Group II were males, whereas 5 (20%) patients in Group I and 6 (24%) patients in Group II were females. The difference in gender distribution between the two groups was not statistically significant (P = 0.73).

With respect to ASA physical status, 10 (40%) patients in Group I and 11 (44%) patients in Group II belonged to ASA Grade I, whereas 15 (60%) patients in Group I and 14 (56%) patients in Group II belonged to ASA Grade II. The distribution of ASA grades was not statistically significant (P = 0.77).

Overall, there were no statistically significant differences in the baseline demographic and clinical characteristics between the two groups (P > 0.05), indicating that the groups were comparable before surgery.



Table 2: Comparison of Hernia Characteristics Between the Two Groups

Parameter Type of Hernia	Group I	Group II	P-value
Direct	9 (36%)	10 (40%)	0.77
Indirect	16 (64%)	15 (60%)	

Compares the hernia characteristics between the Mesh Repair (Group I) and Tissue Repair (Group II) groups. In Group I, 16 (64%) patients had indirect inguinal hernia and 9 (36%) had direct inguinal hernia, whereas in Group II, 15 (60%) patients had indirect inguinal hernia and 10 (40%) had direct inguinal hernia. The difference in the distribution of the type of hernia between the two groups was not statistically significant ($P = 0.77$).

Table 3: Comparison of Duration of surgery Between the Two Groups

Parameter	Group I	Group II	P-value
Duration of surgery (minutes)	48.4 ± 6.5	56.7 ± 7.3	<0.001

The mean duration of surgery was 48.4 ± 6.5 minutes in Group I and 56.7 ± 7.3 minutes in Group II. The mean operative time was shorter in the group I compared to the II group. The difference between the two groups was statistically highly significant ($P < 0.001$). This indicates that mesh repair required significantly less operative time than tissue repair in the management of inguinal hernia.

Table 4: Comparison of Postoperative Pain between the group

Time	Group I	Group II	P-value
6 Hours	4.2 ± 0.8	5.3 ± 0.9	<0.001
24 Hours	2.8 ± 0.7	3.9 ± 0.8	<0.001
48 Hours	1.6 ± 0.5	2.4 ± 0.6	<0.001

Postoperative pain was assessed using the Visual Analogue Scale (VAS) at 6, 24, and 48 hours after surgery in both groups. At 6 hours, the mean VAS score was 4.2 ± 0.8 in Group I and 5.3 ± 0.9 in Group II. At 24 hours, the mean VAS score decreased to 2.8 ± 0.7 in Group I and 3.9 ± 0.8 in Group II. At 48 hours, the mean VAS score further decreased to 1.6 ± 0.5 in Group I and 2.4 ± 0.6 in Group II.

The postoperative pain scores were consistently lower in the Mesh Repair group than in the Tissue Repair group at all postoperative time intervals. The differences between the two groups at 6, 24, and 48 hours were



statistically highly significant ($P < 0.001$), indicating that patients who underwent mesh repair experienced significantly less postoperative pain compared to those who underwent tissue repair.

Table 5: Comparison of Postoperative Complications between the group

Complication	Group I	Group II	P-value
Wound Infection	1 (4%)	2 (8%)	0.55
Seroma	2 (8%)	3 (12%)	0.63
Hematoma	1 (4%)	2 (8%)	0.55
Urinary Retention	1 (4%)	1 (4%)	1.00
Chronic Groin Pain	1 (4%)	4 (16%)	0.16

Postoperative complications, including wound infection, seroma, hematoma, urinary retention, and chronic groin pain, were compared between the two groups. Although the frequency of complications was lower in the Mesh Repair group, the differences in the incidence of individual complications were not statistically significant ($P > 0.05$). The overall complication rate was 24% in the Mesh Repair group and 48% in the Tissue Repair group; however, this difference was also not statistically significant ($P = 0.08$). These findings suggest that both procedures had comparable postoperative complication rates, although a lower incidence of complications was observed in the Mesh Repair group.

Table 6: Comparison of Recurrence During Follow-up between the group

Recurrence	Group I	Group II	P-value
Yes	0 (0%)	2 (8%)	0.149
No	25 (100%)	23 (92%)	

The recurrence of inguinal hernia was assessed during the follow-up period in both groups. In Group I (Mesh Repair), no patient (0%) developed recurrence, whereas in Group II (Tissue Repair), 2 patients (8%) experienced recurrence. Although recurrence was observed only in the Tissue Repair group, the difference between the two groups was not statistically significant ($P = 0.149$). This finding indicates that the recurrence rates were comparable between the two groups during the follow-up period, despite a lower recurrence rate observed in the Mesh Repair group.



Table 7: Comparison of Patient Satisfaction between the group

Patient Satisfaction	Group I	Group II	P-value
Excellent	18 (72%)	10 (40%)	
Good	6 (24%)	11 (44%)	
Fair	1 (4%)	4 (16%)	0.03

Patient satisfaction was assessed at the end of the follow-up period in both groups. In Group I (Mesh Repair), 18 (72%) patients reported excellent satisfaction, 6 (24%) reported good satisfaction, and 1 (4%) reported fair satisfaction. In Group II (Tissue Repair), 10 (40%) patients reported excellent satisfaction, 11 (44%) reported good satisfaction, and 4 (16%) reported fair satisfaction.

The proportion of patients reporting excellent satisfaction was higher in the Mesh Repair group than in the Tissue Repair group. The difference in the overall distribution of patient satisfaction between the two groups was statistically significant ($P = 0.03$). These findings indicate that patients who underwent mesh repair experienced significantly greater overall satisfaction compared to those who underwent tissue repair.

DISCUSSION

Inguinal hernia is one of the most common surgical conditions encountered worldwide and remains a major public health concern due to its high prevalence, associated morbidity, and significant healthcare costs. It occurs when intra-abdominal contents protrude through a weak area in the inguinal canal, resulting in a visible or palpable swelling in the groin. The condition is more common in males because of anatomical differences in the inguinal region, although females can also be affected. The lifetime risk of developing an inguinal hernia is estimated to be approximately 27% in men and 3% in women. Surgical repair is the only definitive treatment and is recommended to relieve symptoms, prevent complications such as incarceration and strangulation, and improve the patient's quality of life.

A total of 50 patients aged 18–65 years, diagnosed with primary uncomplicated inguinal hernia, belonging to ASA Grade I and II, and scheduled for elective inguinal hernia repair were included in the study. The patients were randomly divided into two groups, with 25 patients in each group. Group I Patients undergo Mesh Repair. Group II Patients undergo Tissue Repair.

Following were the key findings:

1. The demographic characteristics (age, gender, height, weight and ASA grade) and were similar in both the two groups.
2. The type of inguinal hernia (direct or indirect) was similar in both groups, and there was no significant difference between them ($P = 0.77$). This shows that both groups were comparable before surgery, making the comparison of the two surgical techniques fair and reliable.
3. The mean duration of surgery was significantly shorter in the Mesh Repair group compared with the Tissue Repair group (48.4 ± 6.5 vs. 56.7 ± 7.3 minutes, $P < 0.001$).
4. Postoperative pain scores at 6, 24, and 48 hours were significantly lower in the group I than in the group II.
5. Postoperative complications were less frequent in the group I, the differences were not statistically significant ($P > 0.05$).



6. No recurrence was observed in the group I, whereas recurrence occurred in 8% of patients in the group II. Although this difference was not statistically significant.

7. Patient satisfaction was significantly higher in the group I than in the group II.

Navalyal SR et al (2025) conducted a prospective study on 200 patients (100 mesh, 100 non-mesh). They found comparable baseline characteristics, significantly lower recurrence (3% vs. 12%), less postoperative pain, earlier return to work, higher patient satisfaction, and comparable early complications in the mesh group.

Hentati H et al. (2009) conducted a meta-analysis of 9 studies comparing mesh and non-mesh repair for strangulated inguinal hernia. They found that mesh repair had significantly lower recurrence rates and a trend toward lower wound infection rates, supporting the safety and effectiveness of mesh repair.

van Veen RN et al. (2007) conducted a randomized trial involving 300 patients with long-term follow-up. They reported a significantly lower 10-year recurrence rate with mesh repair (1%) compared with non-mesh repair (17%) ($P = 0.005$), demonstrating the long-term superiority of mesh repair.

Anadol AZ et al. (2011) conducted study on 60 patients undergoing conventional Lichtenstein repair or self-adhesive mesh repair. They found that self-adhesive mesh significantly reduced operative time and early postoperative pain, while recurrence rates and long-term chronic pain were similar between the two groups.

CONCLUSION

In this Study patients who underwent mesh repair had a significantly shorter operative time, lower postoperative pain scores, and higher levels of patient satisfaction compared with those who underwent tissue repair. Although postoperative complications and recurrence rates were lower in the mesh repair group, the differences were not statistically significant. These findings suggest that both procedures are safe; however, mesh repair provides better postoperative recovery and improved patient-reported outcomes.

This study concluded that mesh repair offers several clinical advantages over tissue repair, including reduced operative time, decreased postoperative pain, and greater patient satisfaction, while maintaining comparable safety and recurrence rates. Based on these findings, tension-free mesh repair may be considered the preferred surgical technique for the management of uncomplicated inguinal hernia.

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