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A COMPARATIVE STUDY OF MESH REPAIR VERSUS ANATOMICAL REPAIR IN PATIENTS UNDERGOING SURGERY FOR INGUINAL HERNIA AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Inguinal hernia is one of the most common surgical conditions encountered in general surgical practice. Surgical repair remains the definitive treatment for symptomatic inguinal hernia. Conventional anatomical tissue repair techniques have gradually been replaced by tension-free mesh repair because of reduced postoperative pain, earlier recovery, and lower recurrence rates.

Aim: To compare the postoperative outcomes of mesh repair and anatomical repair in patients undergoing surgery for uncomplicated inguinal hernia.

Methods: A prospective comparative study was conducted among 140 patients diagnosed with uncomplicated inguinal hernia in the Department of General Surgery. Patients were divided into two equal groups. Group A underwent anatomical tissue repair, while Group B underwent Lichtenstein tension-free mesh repair. Patients aged 18–70 years with primary unilateral uncomplicated inguinal hernia were included. Patients with recurrent hernia, bilateral hernia, strangulated hernia, severe systemic illness, or previous lower abdominal surgery were excluded. Operative duration, postoperative pain, hospital stay, complications, return to normal activity, and recurrence during follow-up were evaluated. Data were analyzed using SPSS software version 18. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were represented as percentages. The independent t-test and Chi-square test were used. A p-value less than 0.05 was considered statistically significant.

Results: Both groups were comparable with respect to age distribution and clinical presentation. Groin swelling was present in all patients. Operative duration was significantly longer in the mesh repair group. However, patients undergoing mesh repair had significantly lower postoperative pain scores, shorter hospital stay, earlier return to normal activity, and lower recurrence rate. Wound infection and seroma formation were significantly more common in the anatomical repair group.

Conclusion: Lichtenstein tension-free mesh repair demonstrated better postoperative outcomes compared with anatomical tissue repair in uncomplicated inguinal hernia. Reduced pain, shorter hospitalization, earlier return to normal activity, fewer complications, and lower recurrence were important advantages of mesh repair. Mesh repair may therefore be considered the preferred surgical technique for primary uncomplicated inguinal hernia.

Keywords: Anatomical Repair, Comparative Study, Inguinal Hernia, Lichtenstein Hernioplasty, Mesh Repair, Surgical Outcomes.

INTRODUCTION

Inguinal hernia is one of the most frequently encountered conditions in general surgical practice and accounts for a large proportion of elective surgical procedures worldwide. It occurs when abdominal contents protrude through a weakness in the inguinal region and commonly presents as a groin swelling with or without discomfort. Inguinal hernia repair forms

a major component of both elective and emergency surgical workload.¹ The burden is particularly important because affected individuals are often adults in the economically productive age group.

The development of inguinal hernia is influenced by anatomical weakness of the inguinal canal, raised intra-abdominal pressure, age-related connective tissue changes, chronic cough, constipation, heavy manual work, smoking, and genetic predisposition. Inguinal hernia is a common abdominal wall disorder with considerable surgical relevance because of its high frequency and potential complications.² Males are more commonly affected because of anatomical factors related to the inguinal canal and descent of the testis.

Although some inguinal hernias may remain minimally symptomatic, surgery remains the definitive treatment for symptomatic cases. Untreated hernias may enlarge over time and may occasionally become irreducible, obstructed, or strangulated. Repair is advised for symptomatic inguinal hernia to relieve symptoms and prevent complications.³ The choice of operative technique is important because postoperative pain, recurrence, return to activity, and long-term patient satisfaction vary according to the method of repair.

Traditional anatomical repairs, including Bassini and Shouldice techniques, are based on approximation of native tissues to reconstruct the posterior wall of the inguinal canal. These techniques depend on tissue strength and require suturing under varying degrees of tension. Tissue-based repair is an established technique for groin hernia repair.⁴ However, conventional anatomical repair may be associated with postoperative pain, delayed ambulation, tissue ischemia, and recurrence when tissue approximation is under tension.

The introduction of prosthetic mesh changed the surgical management of inguinal hernia. Tension-free hernioplasty using polypropylene mesh reinforces the posterior wall of the inguinal canal without placing tension on surrounding tissues.⁵ This approach reduces the mechanical stress on suture lines and provides durable reinforcement of the myopectineal orifice. The principle of tension-free repair is now widely accepted in the management of adult primary inguinal hernia.

Comparative evidence has supported the use of mesh-based repair. Mesh repair has been associated with lower recurrence compared with non-mesh methods in open groin hernia surgery.⁶ Reduced recurrence is one of the major reasons for widespread adoption of Lichtenstein repair. In addition, mesh repair may reduce tissue trauma and allow earlier mobilization.

Postoperative recovery is an important outcome in hernia surgery. Pain, wound complications, hospital stay, time required to resume normal activity, and recurrence influence both patient satisfaction and healthcare burden. The Lichtenstein technique is considered a simple, reproducible, tension-free method with favourable results in routine surgical practice.⁷ However, evaluation of outcomes in individual hospital settings remains useful because patient selection, operative expertise, postoperative care, and follow-up practices may differ.

The present study was conducted to compare postoperative outcomes of anatomical tissue repair and Lichtenstein tension-free mesh repair in patients undergoing surgery for uncomplicated inguinal hernia.

MATERIALS AND METHODS

This prospective comparative study was conducted in the Department of General Surgery of a tertiary care teaching hospital. A total of 140 patients diagnosed with uncomplicated inguinal hernia were included in the study. Patients were divided into two equal groups. Group A included 70 patients who underwent anatomical tissue repair, while Group B included 70 patients who underwent Lichtenstein tension-free mesh repair.

Patients aged between 18 and 70 years with primary unilateral uncomplicated inguinal hernia were included. Patients with recurrent hernia, bilateral hernia, strangulated hernia, obstructed hernia, severe systemic illness, or history of previous lower abdominal surgery were excluded. These exclusion criteria were applied to maintain comparability between groups and to avoid factors that could independently affect operative difficulty, complications, and recurrence.

A detailed clinical history was obtained from each participant. Information regarding age, duration of symptoms, groin swelling, pain or discomfort, reducibility, history of irreducibility, occupation, comorbidities, and previous surgical history was recorded. A thorough clinical examination was performed to confirm diagnosis and assess the side and type of hernia. Basic preoperative investigations and anesthetic evaluation were completed according to institutional protocol.

Patients in the anatomical repair group underwent conventional tissue repair according to the operating surgeon's assessment and standard departmental practice. Patients in the mesh repair group underwent Lichtenstein tension-free hernioplasty using prosthetic mesh reinforcement of the posterior wall of the inguinal canal. Operative duration was recorded in minutes from skin incision to skin closure.

Postoperative pain was assessed using the Visual Analogue Scale. Duration of hospital stay was recorded from the day of surgery to discharge. Postoperative complications including wound infection, seroma, hematoma, and chronic groin pain

were documented. Return to normal daily activity was assessed during follow-up. Recurrence during the follow-up period was recorded clinically.

Data were entered into a structured data sheet and analyzed using SPSS software version 18. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were expressed as frequencies and percentages. The independent t-test was used to compare continuous variables between the two groups, while the Chi-square test was used to compare categorical variables. A p-value less than 0.05 was considered statistically significant.

Institutional ethical committee approval was obtained prior to commencement of the study. Informed consent was obtained from all patients before inclusion.

RESULTS

A total of 140 patients diagnosed with uncomplicated inguinal hernia were included in the study, with 70 patients each in the anatomical repair and mesh repair groups.

Table 1: Age Distribution of Study Participants

Age Group (Years)	Anatomical Repair n (%)	Mesh Repair n (%)
18–30	12 (17.1)	10 (14.3)
31–40	18 (25.7)	21 (30.0)
41–50	20 (28.6)	23 (32.9)
51–60	14 (20.0)	11 (15.7)
>60	6 (8.6)	5 (7.1)

The majority of patients in both groups belonged to the 41–50-year age category. In the anatomical repair group, 20 (28.6%) patients belonged to this age group, while in the mesh repair group, 23 (32.9%) patients were aged between 41 and 50 years. The age distribution was broadly comparable between groups.

Table 2: Clinical Presentation of Inguinal Hernia

Clinical Feature	Anatomical Repair n (%)	Mesh Repair n (%)
Groin swelling	70 (100.0)	70 (100.0)
Pain/discomfort	52 (74.3)	55 (78.6)
Reducible swelling	61 (87.1)	64 (91.4)
Irreducibility	9 (12.9)	6 (8.6)

Groin swelling was present in all patients in both groups. Pain or discomfort was reported by 52 (74.3%) patients in the anatomical repair group and 55 (78.6%) patients in the mesh repair group. Most hernias were reducible at presentation.

Table 3: Comparison of Operative Duration

Procedure	Mean Operative Duration (minutes)	p-value
Anatomical Repair	52.8 $\pm$ 9.2	0.018
Mesh Repair	59.4 $\pm$ 8.7	

The mean operative duration was significantly longer in the mesh repair group. Patients undergoing mesh repair required an average operative duration of 59.4 $\pm$ 8.7 minutes compared with 52.8 $\pm$ 9.2 minutes in the anatomical repair group.

Table 4: Comparison of Postoperative Pain Scores

Procedure	Mean VAS Score	p-value
Anatomical Repair	6.4 $\pm$ 1.3	<0.001
Mesh Repair	4.2 $\pm$ 1.1	

Postoperative pain scores were significantly lower among patients undergoing mesh repair. The mean Visual Analogue Scale score was 4.2 ± 1.1 in the mesh repair group compared with 6.4 ± 1.3 in the anatomical repair group.

Table 5: Duration of Hospital Stay

Hospital Stay	Anatomical Repair n (%)	Mesh Repair n (%)
≤3 days	18 (25.7)	46 (65.7)
4–5 days	39 (55.7)	20 (28.6)
>5 days	13 (18.6)	4 (5.7)

Patients undergoing mesh repair demonstrated shorter hospital stay. In the mesh repair group, 46 (65.7%) patients were discharged within three days compared with 18 (25.7%) patients in the anatomical repair group.

Table 6: Postoperative Complications Among Study Participants

Complication	Anatomical Repair n (%)	Mesh Repair n (%)	p-value
Wound infection	12 (17.1)	4 (5.7)	0.031
Seroma	9 (12.9)	3 (4.3)	0.044
Hematoma	6 (8.6)	2 (2.9)	0.148
Chronic groin pain	10 (14.3)	5 (7.1)	0.176

Wound infection and seroma formation were significantly more common in the anatomical repair group. Hematoma and chronic groin pain were also more frequent after anatomical repair, although these differences were not statistically significant.

Table 7: Time Required for Return to Normal Activity

Procedure	Mean Duration (days)	p-value
Anatomical Repair	15.2 ± 3.8	<0.001
Mesh Repair	9.3 ± 2.7	

Patients undergoing mesh repair returned to normal daily activities significantly earlier than those undergoing anatomical repair. Mean return to activity was 9.3 ± 2.7 days in the mesh repair group compared with 15.2 ± 3.8 days in the anatomical repair group.

Table 8: Recurrence During Follow-Up

Recurrence	Anatomical Repair n (%)	Mesh Repair n (%)	p-value
Present	8 (11.4)	2 (2.9)	0.046
Absent	62 (88.6)	68 (97.1)	

Recurrence during follow-up was significantly higher among patients undergoing anatomical repair. Recurrence was observed in 8 (11.4%) anatomical repair patients compared with 2 (2.9%) mesh repair patients.

DISCUSSION

The present prospective comparative study evaluated postoperative outcomes among patients undergoing anatomical repair and Lichtenstein tension-free mesh repair for uncomplicated inguinal hernia. Mesh repair was associated with lower postoperative pain, shorter hospital stay, earlier return to normal activity, fewer wound-related complications, and lower recurrence rate.

The majority of patients in both groups belonged to the middle-aged adult age category. Rutkow reported that hernia repair is a common surgical procedure with substantial healthcare burden, especially among adult males.⁸ In the present study, most patients were between 31 and 50 years of age, which is consistent with the tendency of inguinal hernia to affect active adults exposed to physical work and raised intra-abdominal pressure.

Groin swelling was present in all patients, while pain or discomfort was reported by approximately three-fourths of patients in both groups. Fitzgibbons et al. reported that men with minimally symptomatic inguinal hernia may remain under observation in selected cases, but symptomatic patients commonly undergo repair because of discomfort and risk of progression.⁹ The present study included patients undergoing operative management, and therefore symptoms such as swelling and discomfort were common.

Operative duration was significantly longer in the mesh repair group. This may be due to additional steps required for placement, trimming, positioning, and fixation of the mesh. Bringman et al. reported that operative duration may differ between repair techniques depending on procedure type and surgeon familiarity.¹⁰ Although mesh repair took slightly longer in the present study, the additional operative time was offset by better postoperative outcomes.

Postoperative pain was significantly lower in the mesh repair group. The reduced pain may be explained by the tension-free nature of mesh repair, which avoids excessive approximation of native tissues. Amid emphasized that tension-free hernioplasty reduces tissue tension and contributes to improved postoperative comfort.¹¹ Anatomical repair involves suturing under tension, which may produce greater pain, tissue ischemia, and discomfort during early mobilization.

Hospital stay was shorter among patients who underwent mesh repair. This finding is clinically relevant because reduced hospitalization decreases healthcare burden and allows earlier resumption of routine life. EU Hernia Trialists Collaboration reported that mesh repair is associated with favourable recurrence outcomes and has become an important standard in groin hernia surgery.¹² In the present study, most mesh repair patients were discharged within three days, whereas most anatomical repair patients stayed for four to five days.

Wound infection and seroma formation were significantly more common in the anatomical repair group. Tissue tension, greater local tissue handling, dead space, and delayed mobilization may contribute to postoperative wound morbidity. Post et al. reported that mesh repair can achieve effective outcomes with acceptable complication rates when proper surgical technique and asepsis are maintained.¹³ The lower infection and seroma rate in the mesh group in the present study supports the safety of Lichtenstein repair in uncomplicated cases.

Chronic groin pain was more frequent after anatomical repair, although the difference was not statistically significant. Chronic postoperative pain after inguinal hernia repair is a clinically important concern. Poobalan et al. reported that chronic pain after inguinal hernia repair can influence quality of life and may be associated with nerve injury, tissue tension, and postoperative complications.¹⁴ The lower pain scores and lower chronic groin pain frequency in the mesh group suggest that tension-free repair may improve patient comfort.

Return to normal activity was significantly earlier in the mesh repair group. Callesen et al. showed that recovery after groin hernia repair is influenced by pain, repair technique, and postoperative advice.¹⁵ In the present study, patients undergoing mesh repair returned to normal activity approximately six days earlier than those undergoing anatomical repair. This has socioeconomic importance, particularly among working adults and manual labourers.

Recurrence was significantly lower after mesh repair. Scott et al., in a Cochrane review, reported that open mesh repair is associated with reduced recurrence compared with non-mesh repair.¹⁶ The present study is consistent with this evidence, as recurrence was 2.9% in the mesh repair group compared with 11.4% in the anatomical repair group. Mesh reinforcement strengthens the posterior wall of the inguinal canal and reduces dependence on weakened native tissue.

The choice of hernia repair technique should consider recurrence, pain, complications, cost, patient profile, and surgical expertise. Simons et al. published European Hernia Society guidelines recommending evidence-based selection of repair technique, with mesh-based repair commonly preferred for adult inguinal hernia.¹⁷ The findings of the present study support Lichtenstein mesh repair as an effective procedure for primary uncomplicated inguinal hernia.

Long-term follow-up is important because recurrence and chronic pain may appear after the early postoperative period. Burcharth et al. described the role of patient-related and technical factors in recurrence after inguinal hernia repair.¹⁸ In the present study, recurrence was lower in the mesh repair group, but the limited follow-up duration restricts long-term interpretation. Longer follow-up would provide stronger evidence regarding durability of repair.

CONCLUSION

Lichtenstein tension-free mesh repair demonstrated superior postoperative outcomes compared with anatomical tissue repair in patients with uncomplicated inguinal hernia. Although operative duration was slightly longer in the mesh repair group, patients experienced significantly lower postoperative pain, shorter hospital stay, earlier return to normal activity, fewer wound complications, and lower recurrence rate. Anatomical repair was associated with greater postoperative morbidity and higher recurrence. Mesh repair may therefore be considered the preferred technique for primary uncomplicated inguinal hernia repair when patient profile and surgical expertise are suitable.

REFERENCES

1. Primates P, Goldacre MJ. Inguinal hernia repair: incidence of elective and emergency surgery. *Int J Epidemiol*. 1996;25(4):835-839.
2. Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. *Lancet*. 2003;362(9395):1561-1571.
3. Jenkins JT, O'Dwyer PJ. Inguinal hernias. *BMJ*. 2008;336(7638):269-272.
4. Shouldice EE. The Shouldice repair for groin hernias. *Surg Clin North Am*. 2003;83(5):1163-1187.
5. Lichtenstein IL, Shulman AG, Amid PK, Montllor MM. The tension-free hernioplasty. *Am J Surg*. 1989;157(2):188-193.
6. EU Hernia Trialists Collaboration. Mesh compared with non-mesh methods of open groin hernia repair. *Br J Surg*. 2000;87(7):854-859.
7. Amid PK. Lichtenstein tension-free hernioplasty. *Contemp Surg*. 1991;39:129-137.
8. Rutkow IM. Demographic and socioeconomic aspects of hernia repair in the United States in 2003. *Surg Clin North Am*. 2003;83(5):1045-1051.
9. Fitzgibbons RJ Jr, Giobbie-Hurder A, Gibbs JO, Dunlop DD, Reda DJ, McCarthy M Jr, et al. Watchful waiting vs repair of inguinal hernia in minimally symptomatic men: a randomized clinical trial. *JAMA*. 2006;295(3):285-292.
10. Bringman S, Wollert S, Osterberg J, Smedberg S, Granlund H, Heikkinen TJ. Early results of a randomized multicenter trial comparing laparoscopic and Lichtenstein hernia repair. *Br J Surg*. 2001;88(6):748-753.
11. Amid PK. The Lichtenstein repair in 2002: an overview of causes of recurrence after Lichtenstein tension-free hernioplasty. *Hernia*. 2003;7(1):13-16.
12. EU Hernia Trialists Collaboration. Repair of groin hernia with synthetic mesh: meta-analysis of randomized controlled trials. *Ann Surg*. 2002;235(3):322-332.
13. Post S, Weiss B, Willer M, Neufang T, Lorenz D. Randomized clinical trial of lightweight composite mesh for Lichtenstein inguinal hernia repair. *Br J Surg*. 2004;91(1):44-48.
14. Poobalan AS, Bruce J, Smith WCS, King PM, Krukowski ZH, Chambers WA. A review of chronic pain after inguinal herniorrhaphy. *Clin J Pain*. 2003;19(1):48-54.
15. Callesen T, Bech K, Kehlet H. Prospective study of chronic pain after groin hernia repair. *Br J Surg*. 1999;86(12):1528-1531.
16. Scott NW, McCormack K, Graham P, Go PMNYH, Ross SJ, Grant AM. Open mesh versus non-mesh for groin hernia repair. *Cochrane Database Syst Rev*. 2002;(4):CD002197.
17. Simons MP, Aufenacker T, Bay-Nielsen M, Bouillot JL, Campanelli G, Conze J, et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. *Hernia*. 2009;13(4):343-403.
18. Burcharth J, Pommergaard HC, Bisgaard T, Rosenberg J. Patient-related risk factors for recurrence after inguinal hernia repair: a systematic review and meta-analysis of observational studies. *Surg Innov*. 2015;22(3):303-317.