Original Article

A Prospective Study on Clinical Outcomes of Lichtenstein Tension-Free Mesh Hernioplasty in Adults Aged 18–50 Years in East Singhbhum Region

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Abstract

Background: Inguinal hernia repair remains one of the most frequently performed general surgical procedures worldwide. Among various repair techniques, the Lichtenstein tension-free mesh hernioplasty has gained prominence due to its simplicity, reproducibility, and low recurrence rate. This study aimed to evaluate the clinical outcomes of Lichtenstein tension-free mesh hernioplasty among adults aged 18–50 years in East Singhbhum, Jharkhand, India. **Material and Methods:** A prospective, facility-based observational study was conducted at the Department of General Surgery, MGM Medical College & Hospital, Jamshedpur, between June 2023 and December 2024. A total of 120 patients diagnosed with uncomplicated inguinal hernia were included using consecutive sampling. Data were collected on demographic characteristics, type of hernia, postoperative complications, pain (assessed by Visual Analogue Scale), and return to normal activity. Statistical analysis was performed using SPSS version 23, with $p \leq 0.05$ considered significant. **Results:** The mean age of participants was 37.48 ± 9.34 years; males predominated (62.5%). Right-sided hernias (73.3%) and indirect type (65%) were most common. Early postoperative complications occurred in 22.5% of cases, the most frequent being urinary retention (11.7%) and infection (10.8%). Late complications were minimal (10%), chiefly neuralgia (5%). Mean VAS pain scores decreased from 6.0 ± 0.82 on day 2 to 0.26 ± 0.53 after 6 months. Most patients (65.8%) resumed normal activity within 7 days. Age ($p = 0.002$) and gender ($p = 0.001$) were significantly associated with recovery duration. **Conclusion:** Lichtenstein tension-free mesh hernioplasty demonstrated excellent short- and mid-term outcomes, with minimal morbidity, rapid recovery, and high patient satisfaction. The procedure is safe, effective, and well-suited for use in resource-limited surgical centers.

Keywords: Lichtenstein hernioplasty, inguinal hernia, mesh repair, postoperative pain, complications, East Singhbhum.

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Introduction

Inguinal hernia represents one of the most common surgical conditions worldwide, accounting for over 75% of all abdominal wall hernias.[1] The condition is characterized by the protrusion of intra-abdominal contents through a weakened region of the inguinal canal, often resulting from congenital predisposition or acquired weakness of the transversalis fascia.[2] Repair of inguinal hernia remains a cornerstone of general surgery, with millions of procedures performed annually.[3]

Historically, Bassini introduced the first successful anatomic repair in 1887, reducing recurrence rates significantly.[4] However, tissue-based repairs often suffered from tension along suture lines, leading to postoperative pain and recurrence.[5]

The advent of prosthetic mesh repair, particularly the Lichtenstein tension-free technique introduced in 1984, revolutionized hernia surgery.[6] By eliminating suture-line tension and reinforcing the posterior wall with mesh, the technique provided durable repair with low recurrence rates.[7]

Studies have shown Lichtenstein repair to yield recurrence rates between 0% and 2%, with reduced postoperative pain and shorter hospital stays compared to traditional repairs.[8,9] However, outcomes may vary with demographic factors, surgical skill, and postoperative care, especially in low-resource regions.[10]

Despite its global acceptance, data from Eastern India—particularly Jharkhand—remain limited.

Aim: This study aimed to assess the clinical outcomes of Lichtenstein tension-free mesh hernioplasty in adults aged 18–50 years in East Singhbhum, Jharkhand, focusing on postoperative complications, pain scores, recovery duration, and patient satisfaction.

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Materials and Methods

Study Design and Setting: This was a prospective, facility-based observational study conducted in the Department of General Surgery, MGM Medical College and Hospital, Jamshedpur, Jharkhand, between June 2023 and December 2024.

Sample Size and Sampling: The sample size was calculated using the formula

$N = (Z_{1-\alpha/2} / \varepsilon)^2$,

where $\varepsilon = 20\%$ relative precision and 95% confidence level. The estimated minimum sample size was 100, and considering a 20% non-response rate, the final sample size was 120. Patients were selected using consecutive sampling.

Inclusion Criteria

- Adults aged 18–50 years with a diagnosis of uncomplicated inguinal hernia.
- Willing to provide informed consent.
- Fit for elective surgery under regional anesthesia.

Exclusion Criteria

- Strangulated or obstructed hernias.
- Diabetes mellitus, malignancy, or end-stage renal disease.
- Patients unwilling to participate.

Study Tools and Data Collection

A semi-structured, pretested schedule was used to record demographic and clinical data. Investigations included complete blood count, urine analysis, and ultrasonography of the abdomen.

Postoperative pain was assessed using a Visual Analogue Scale (VAS) from 0 (no pain) to 10 (worst pain). Follow-up evaluations were performed on day 2, day 7, day 28, day 42, and day 180.

Surgical Procedure: All surgeries were performed by the same surgical team following the standard Lichtenstein tension-free mesh repair technique. A polypropylene mesh (3 × 5 inch) was positioned over the posterior wall of the inguinal canal and secured with non-absorbable 2–0 Prolene sutures.

Patients received a single dose of intravenous second-generation cephalosporin preoperatively and postoperative analgesia with NSAIDs. Early ambulation was encouraged within 6 hours post-surgery.

Statistical Analysis: Data were analyzed using SPSS v23. Descriptive statistics (mean ± SD, proportions) were used to summarize data. Associations between categorical variables were tested using the Chi-square test. A $p \leq 0.05$ was considered statistically significant.

Results

Demographic Characteristics: The mean age of participants was 37.48 ± 9.34 years, with the largest proportion (45.8%) aged 30–42 years. Males constituted 62.5% of cases. Nearly half (47.5%) were unskilled laborers [Table 1].

Table 1: Demographic profile of study participants (n = 120)

Variable	Category	Frequency (%)
Age group (years)	18–30	25 (20.8)
	30–42	55 (45.8)
	> 42	40 (33.4)
Gender	Male	75 (62.5)
	Female	45 (37.5)
Occupation	Unskilled	57 (47.5)
	Semi-skilled	30 (25.0)
	Homemaker	27 (22.5)
	Unemployed	6 (5.0)

Clinical Presentation

Right-sided hernias were most common (73.3%), followed by left-sided (20%) and bilateral (6.7%). Indirect inguinal hernia accounted for 65% of cases.

About 55.8% contained intestinal loops, while 44.2% contained omentum. Most hernias were partially reducible (75%), and 81.7% showed a visible cough impulse.

Postoperative Complications

Early complications were seen in 27 of 120 patients (22.5%). Urinary retention (11.7%) and infection (10.8%) were most frequent. Late complications were minimal—neuralgia (5%), scar tenderness (3.3%), and wound dehiscence (1.7%). No mesh rejection or recurrence was observed [Table 2].

Table 2: Postoperative complications among study subjects (n = 120)

Complication	Early (%)	Late (%)
Urinary retention	11.7	—
Infection	10.8	—
Hematoma	10.0	—
Seroma	3.3	—
Scrotal swelling	7.5	—
Neuralgia	4.2	5.0
Scar tenderness	—	3.3
Wound dehiscence	—	1.7
Recurrence	—	0

Postoperative Pain

VAS scores declined markedly over follow-up: Day 2 = 6.00 ± 0.82, Day 7 = 2.78 ± 1.07, Day 28 = 1.80 ± 1.14, and 6 months = 0.26 ± 0.53.

This demonstrated significant pain reduction with time ($p < 0.001$).

Return to Normal Activity

Most patients (65.8%) resumed normal activity within 7 days, 25.8% within 7–30 days, and 8.4% after > 30 days. Age ($p = 0.002$) and gender ($p = 0.001$) significantly influenced recovery duration, while postoperative complications and hernia type did not [Table 3].

Table 3: Factors associated with return to normal activity (n = 120)

Variable	Within 7 days (%)	7–30 days (%)	> 30 days (%)	p-value
Age (years)				0.002
18–30	80.0	12.0	8.0	
30–42	47.0	38.0	15.0	
> 42	40.0	37.5	22.5	
Gender				0.001
Male	78.7	16.0	5.3	
Female	44.4	42.2	13.4	

Patient Satisfaction: Overall satisfaction was high—77.5% rated the procedure as excellent, 18.3% as good, and 4.2% as average. No participant rated it poor.

Discussion

This study demonstrated that Lichtenstein tension-free mesh hernioplasty yields excellent clinical outcomes among adults aged 18–50 years, consistent with international literature.

The mean age (37.5 years) and male predominance (62.5%) reflect global demographic trends for inguinal hernia, likely related to occupational strain and collagen metabolism differences.[11,12] The predominance of right-sided (73.3%) and indirect (65%) hernias aligns with previous findings by Sakorafas et al. who reported indirect hernias in 55% of cases.[13]

The overall early complication rate (22.5%) in this study is comparable to Haque et al. who observed seroma and transient swelling in 5.6% and 10.6%, respectively.[14] None of the patients developed recurrence or mesh rejection, supporting the durability of polypropylene mesh as reported by Amid.[15]

Pain control was satisfactory, as shown by a rapid decline in VAS scores. Similar outcomes were noted by Ravinder Kumar et al., who demonstrated faster pain resolution and reduced analgesic use following mesh repair.[16] Postoperative neuralgia (5%) was mild and self-limited, correlating with the 3–7% incidence described by Hakeem and Shanmugam.[17]

The return to normal activity within a week in two-thirds of patients highlights the minimally invasive nature of the procedure. Comparable findings were reported by Beltrán and Cruces, who found rapid mobilization and early resumption of work following Lichtenstein repair.[18]

The absence of recurrence in this cohort underlines the long-term stability of the mesh technique. Meta-analyses have shown that mesh-based repairs significantly reduce recurrence compared to tissue repairs.[19,20] Additionally, 95.8% of patients rated the surgery as “good” or “excellent,” reflecting high satisfaction and acceptance similar to global reports.[21]

Our study reaffirms that the Lichtenstein repair remains the gold standard, combining simplicity, reproducibility, and excellent outcomes.[22] The findings are particularly relevant to resource-limited Indian settings, where cost-effective, low-complication techniques are essential.

Comparison with Other Techniques: Alternative methods, such as Desarda’s tissue repair or Shouldice repair, may reduce mesh-related complications but often require higher surgical expertise and longer operative time. Verma et al. found that Desarda repair led to shorter recovery time but higher early postoperative pain.[23] Similarly, Ossama Baza et al. demonstrated shorter operative duration and hospital stay with Lichtenstein repair compared to modified Shouldice repair.[24]

Strengths and Limitations: A key strength of this study is its prospective design and standardized surgical protocol. However, being single-center with limited follow-up (6 months) restricts long-term recurrence assessment. Larger multicentric studies with extended follow-up are warranted to validate these findings.

Conclusion

Lichtenstein tension-free mesh hernioplasty provides an effective, safe, and reproducible solution for inguinal hernia repair in adults. The procedure demonstrated minimal postoperative pain, low complication rates, and high patient satisfaction. Given its simplicity and rapid recovery profile, it remains the preferred method in general surgical practice, particularly in resource-limited settings.

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Conflicts of interest

There are no conflicts of interest.

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