ORIGINAL ARTICLE

Outcomes Following Lichtenstein Mesh Repair: Single Center Study

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ABSTRACT

Objective: The aim of this study was to evaluate postoperative early and late complications of primary inguinal hernia repair by Lichtenstein Mesh Technique.

Study Design: A Cross-Sectional Study.

Place and Duration of Study: Department of General Surgery, MTI/Hayatabad Medical Complex, Peshawar, from 14 June 2024 to 14 December 2024.

Materials and Methods: A total of 69 patients with primary inguinal hernia, aged 18–70 years, were enrolled via non-probability consecutive sampling. All patients underwent Lichtenstein tension-free mesh repair performed by a consultant surgeon. Early (≤30 days) complications, including hematoma and wound infection, and late (6 months) complications, including chronic groin pain and recurrence, were recorded. The clinico-demographic data were documented, and statistical analysis was performed using SPSS 23. Chi Square and Fisher's Exact test was used and the p value ≤ 0.05 was considered statistically significant.

Results: Among the 69 patients, the recurrence rate was 10.1%. The significant associations were found between hernia recurrence and the following variables: hernia duration ≥5 years ($p < 0.001$), low socioeconomic status ($p < 0.001$), illiteracy ($p < 0.001$), and presence of comorbidities ($p = 0.001$), postoperative hematoma ($p < 0.001$), and chronic groin pain ($p < 0.001$). No statistically significant association was observed with age, hernia type or side, residence, or surgical site infection.

Conclusion: Lichtenstein mesh repair proved safe with acceptable postoperative outcomes. The recurrence rate was 10.1%, significantly linked to prolonged hernia duration, low socioeconomic and educational status, comorbidities, hematoma, and chronic groin pain.

Keywords: *Lichtenstein, Inguinal Hernia, Recurrence.*

Introduction

Inguinal hernia repair is a frequently conducted surgical procedure worldwide. Annually, it constitutes approximately 73% of all abdominal wall hernias and the number of people getting this surgery surpasses 20 million.[1] Mesh repair represents one of the most frequently employed techniques, accounting for approximately 700,000 hernia repairs annually in the United States alone.[2,3] Risk factors for inguinal hernia formation can be categorized into patient-related variables, such as age and sex, and external factors, including physically demanding occupations. The condition exhibits a marked male predominance, with a sevenfold greater frequency in males than in females and demonstrates a predilection for the right side.[4]

The definitive method for hernia diagnosis is clinical examination of the groin. However, clinical examination alone may overlook smaller inguinal hernias; hence, ultrasound (US), magnetic resonance imaging (MRI), and computed tomography (CT) has been used as confirmation or complementary investigations.[5]

The optimal treatment strategy for primary inguinal hernia has been extensively investigated worldwide; however, limited evidence exists regarding the most effective method for repairing recurrent inguinal hernias, and the appropriate surgical approach for this condition remains controversial.[6] Contemporary literature identifies open, tension-free mesh repair as the predominant approach for inguinal hernia management, with the Lichtenstein technique serving as the established standard due to its low recurrence rates and consistent postoperative outcomes. Although laparoscopic repair may reduce early postoperative discomfort, evidence shows comparable long-term results, reinforcing the

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Lichtenstein method as a widely accessible and reliable option.[7,8]

Synthetic mesh in inguinal hernia repair reduces recurrence but may cause persistent groin pain, foreign body sensation, functional limitations, and, rarely, mesh migration or rejection, highlighting the need for careful surgical technique and follow-up.[7,8,9]

Despite the widespread use of mesh-based inguinal hernia repair and extensive global research on primary hernias, evidence regarding postoperative outcomes in routine clinical settings of our region remains insufficient. Existing studies largely focus on recurrence rates, while data on early and late postoperative complications following the Lichtenstein technique are limited and inconsistent. Moreover, variations in patient profiles, surgical expertise, and follow-up practices create a need for locally generated evidence. This gap underscores the importance of evaluating postoperative outcomes within our population. The aim of this study was to evaluate postoperative early and late complications of primary inguinal hernia repair by Lichtenstein mesh technique.

Materials and Methods

This descriptive cross-sectional study was conducted at the Department of General Surgery, MTI/Hayatabad Medical Complex, Peshawar, from 14 June 2024 to 14 December 2024. After obtaining informed consent and Institutional Review Board (IRB) approval (CPSP/REU/SGR-2022-21-13583). The study employed a non-probability consecutive sampling technique. A total of 69 patients were included, based on a calculated sample size using a 4.7% overall postoperative recurrence rate of the Lichtenstein technique for inguinal hernia repair, with a 95% confidence interval and 5% margin of error, using the World Health Organization (WHO) calculator.[10] The eligible patients underwent the Lichtenstein tension-free mesh repair, performed by a consultant general surgeon.

Inclusion criteria comprised of patients aged 18 to 70 years, diagnosed with primary inguinal hernia and scheduled to undergo the Lichtenstein mesh repair, regardless of gender or ethnicity.

While exclusion criteria included patients younger than 18 years, those with recurrent inguinal hernias, hernias managed by techniques other than the Lichtenstein method, obstructed or strangulated hernias, and patients who could not be followed up post-discharge.

The technique involved the placement of a polypropylene mesh over the posterior wall of the inguinal canal, secured with 2/0 polypropylene sutures, without transfixed or excised hernia sacs. Clinico-demographic data, including age, sex, body mass index (BMI), residence, education, socioeconomic status, duration of hernia, laterality, and comorbidities, were documented. Hernia type was recorded intraoperatively.

The outcomes assessed included both early and late postoperative complications. Early complications were defined as those occurring within 30 days post-surgery and included postoperative hematoma, identified through clinical examination and ultrasonography, and postoperative wound infections, defined by the presence of all three of the following: redness, swelling, and pus discharge confirmed via culture.[10] Late complications were assessed at six months postoperatively and included chronic groin pain—defined as persistent pain beyond three months and evaluated using a Visual Analogue Scale (VAS) ranging from 0 (no pain) to 10 (worst possible pain)—and recurrence, defined as the reappearance of a hernia at or near the original site, confirmed clinically and by ultrasound.

Statistical analysis was performed using SPSS version 23. Descriptive statistics such as frequencies and percentages were calculated for categorical variables, including gender, residence, education status, socioeconomic status, hernia side and type, comorbidities, and complications. Continuous variables such as age, BMI, duration of symptoms, and chronic pain scores were summarized using mean ± standard deviation or median with interquartile range (IQR), depending on data normality assessed via the Shapiro–Wilk test. Stratification was conducted for variables including age, gender, hernia type, hernia side, duration of symptoms, postoperative hematoma, surgical site infection (SSI), and chronic pain against the primary outcome of recurrence. Chi-Square or Fisher's Exact tests were applied post-stratification, with a p value ≤ 0.05 considered statistically significant.

Results

The mean age of patients was 42.82±13.06 years. The mean BMI was 24.86±4.09 kg/m^2. Table I shows

the demographic and clinical characteristics of the 69 study participants, including residence, socioeconomic status, education level, hernia characteristics, and postoperative complications.

Table I: Descriptive Statistics (n = 69)

Variable	Category	n (%)
Residence	Urban	26 (37.7%)
	Rural	43 (62.3%)
Socioeconomic Status	Good (>30000 Rs Income/month)	12 (17.4%)
	Poor (<30000 Rs income/month)	57 (82.6%)
Education Status	Literate	17 (24.6%)
	Illiterate	52 (75.4%)
Side of Hernia	Right Inguinal (RIH)	49 (71.0%)
	Left Inguinal (LIH)	20 (29.0%)
Surgical Site Infection	Yes	10 (14.5%)
	No	59 (85.5%)
Type of Hernia	Direct	19 (27.5%)
	Indirect	50 (72.5%)
Comorbidities	None	54 (78.3%)
	Present	15 (21.7%)
Hematoma	Yes	7 (10.1%)
	No	62 (89.9%)
Chronic Pain	Yes	9 (13.0%)
	No	60 (87.0%)
Good (>30000Rs Income/month), **Poor** (<30000 Rs income/month)[11] **Literate**: ability to read and write. **Illiterate**: inability to read and write.[11]		

As illustrated in **Figure 1**, the recurrence rate of hernia was 10.1% (7 out of 69 patients), while 62 patients (89.9%) experienced no recurrence

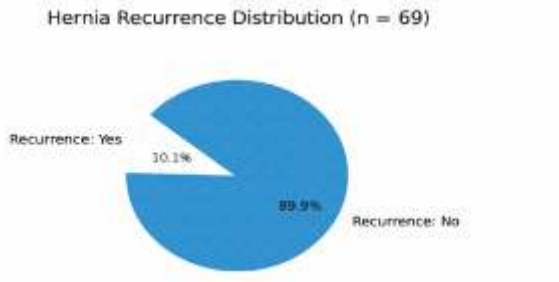

Figure 1: Recurrent Rate

Table 2 displays the cross-tabulation of various clinical and demographic variables with hernia recurrence status. Statistically significant associations were observed using Fisher's Exact test for hernia duration ≥ 5 years ($p < 0.001$), low socioeconomic status ($p < 0.001$), illiteracy ($p < 0.001$), presence of comorbidities ($p = 0.001$), presence of hematoma ($p < 0.001$), and chronic pain ($p < 0.001$). Variables analysed using Chi-Square test that did not show significant associations with recurrence included age ($p = 0.720$), hernia type ($p = 0.948$), and hernia side ($p = 0.393$). Surgical site infection and residence, analysed using Fisher's exact test and Chi-Square test respectively, also did not show significant associations with recurrence ($p = 0.987$ and $p = 0.052$ respectively).

Table II: Comparison of Clinico-demographic With Recurrence

Variable	Category	Recurrence (Yes) n = 7	Recurrence (No) n = 62	P-value
Age Categories	18–40 yrs	3 (42.9%)	31 (50.0%)	0.720
	41–70 yrs	4 (57.1%)	31 (50.0%)	
Hernia Duration	< 5 years	2 (28.6%)	62 (100%)	**<0.001**
	≥ 5 years	5 (71.4%)	0 (0%)	
Residence	Urban	5 (71.4%)	21 (33.9%)	**0.052**
	Rural	2 (28.6%)	41 (66.1%)	
Socioeconomic Status	Low (Yes)	5 (71.4%)	7 (11.3%)	**<0.001**
	Adequate (No)	2 (28.6%)	55 (88.7%)	
Education Status	Illiterate	6 (85.7%)	11 (17.7%)	**<0.001**
	Literate	1 (14.3%)	51 (82.3%)	
Type of Hernia	Direct	2 (28.6%)	17 (27.4%)	0.948
	Indirect	5 (71.4%)	45 (72.6%)	
Side of Hernia	Right (RIH)	4 (57.1%)	45 (72.6%)	0.393
	Left (LIH)	3 (42.9%)	17 (27.4%)	
Surgical Site Infection	Yes	1 (14.3%)	9 (14.5%)	0.987
	No	6 (85.7%)	53 (85.5%)	
Comorbidities	Present	5 (71.4%)	10 (16.1%)	**0.001**
	None	2 (28.6%)	52 (83.9%)	
Hematoma	Yes	6 (85.7%)	1 (1.6%)	**<0.001**
	No	1 (14.3%)	61 (98.4%)	
Chronic Pain	Yes	6 (85.7%)	3 (4.8%)	**<0.001**
	No	1 (14.3%)	59 (95.2%)	

Discussion

In the present study, the overall recurrence rate after inguinal hernia repair was 10.1%, which is within the range reported in international literature. Our findings align with Movahedi *et. al.,*[12] who also reported a recurrence rate of approximately 10%, highlighting the importance of surgical technique and postoperative care. However, this contrasts with Shah et. al.,[13] who documented a significantly lower recurrence rate, possibly due to differences in patient selection criteria and the use of mesh-based tension-free techniques.

A significant association was found between hernia duration ≥ 5 years and recurrence ($p < 0.001$). Our findings align with Lee et. al.,[14] who observed that

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prolonged hernia duration leads to greater tissue weakness and complexity during repair. Conversely, this contrasts with Parker et. al.,[15] who found no significant correlation between duration of hernia and recurrence.

Low socioeconomic status and illiteracy were also significantly associated with recurrence. Our findings align with Laane et al.,[16] who emphasized the role of limited health literacy and delayed healthcare-seeking behaviour in adverse surgical outcomes. In contrast, Kuo et al.,[17] reported no such association, attributing recurrence primarily to technical surgical factors rather than patient demographics.

Postoperative complications, specifically hematoma and chronic pain were strong predictors of recurrence. Our findings align with Tigora et al.,[18] who suggested that tissue trauma and poor wound healing contribute to structural compromise and subsequent recurrence. This contrasts with Reistrup et al.,[19] who argued that postoperative pain does not directly influence long-term hernia recurrence.

The presence of comorbidities was also significantly linked to recurrence, aligning with findings from Siddaiah et al.,[20] who observed that systemic conditions such as diabetes and chronic cough impair healing and increase the risk of recurrence.

The differences between our findings and those reported in other studies are likely explained by variations in sample size, patient characteristics, and surgical techniques, as well as the quality of postoperative care. Such variability reminds us that hernia recurrence is a multifactorial outcome rather than the result of a single determinant. For example, while prolonged hernia duration appeared to play a clear role in our cohort, other investigators have not observed the same effect, suggesting that its impact may depend on patient selection and operative circumstances.

Limitations

This study was limited by its single-center design and relatively small sample size, which may affect the generalizability of the findings. Additionally, long-term follow-up data were not available, which could underestimate the actual recurrence rate. Other factors, such as surgeon expertise and type of mesh used, were not controlled and may have influenced outcomes.

Conclusion

Lichtenstein mesh repair proved safe with acceptable postoperative outcomes. The recurrence rate was 10.1%, significantly linked to prolonged hernia duration, low socioeconomic and educational status, comorbidities, hematoma, and chronic groin pain.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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