Pakistan Journal of Intensive Care Medicine
eISSN: 2708-2261; pISSN: 2958-4728
www.pjicm.com
DOI: https://doi.org/10.54112/pjicm.v5i02.157
*Pak. J. Inten. Care Med., volume 5(2), **2025**: 157*
Original Research Article

FREQUENCY OF SEROMA FORMATION IN PATIENTS UNDERGOING LICHTENSTEIN REPAIR FOR INGUINAL HERNIA

REHMAN A*, AKBAR F

Department of General Surgery, Saidu Group of Teaching Hospital, Swat, Pakistan
**Corresponding author email address:* uatiq30@gmail.com

(Received, 05th March 2025, Revised 18th June 2025, Accepted 06th July, Published 14th July 2025)

ABSTRACT

Background: *Lichtenstein mesh hernioplasty is the most widely performed surgical technique for inguinal hernia repair. Postoperative seroma formation remains a frequent complication that can affect recovery and patient outcomes.* ***Objective:*** *To determine the frequency of seroma formation in patients undergoing Lichtenstein repair for inguinal hernia.* ***Study Design:*** *Descriptive study.* ***Setting:*** *Department of Surgery, Saidu Group of Teaching Hospital, Pakistan.* ***Duration of Study:*** *13-August-2024 to 13-February-2025.* ***Methods:*** *A total of 120 patients with inguinal hernia were enrolled using consecutive non-probability sampling. All patients underwent Lichtenstein mesh hernioplasty under general anaesthesia. Seroma formation was assessed within 30 days postoperatively, defined by pain (VAS > 3), tenderness, and a palpable fluid collection that discharged clear fluid on examination. Data analysis was performed using SPSS version 27.* ***Results:*** *The mean age of patients was 46.17 ± 13.84 years, with 113 (94.2%) males and 7 (5.8%) females. Seroma formation occurred in 9.2% of patients. No significant association was found between seroma and any of the demographic or clinical variables, including age, gender, BMI, hypertension, smoking, or socioeconomic status. However, a significant association was observed between diabetes mellitus and seroma formation ($p < 0.05$).* ***Conclusion:*** *Seroma formation was observed in 9.2% of patients following Lichtenstein repair for inguinal hernia. Diabetes mellitus was significantly associated with an increased risk of seroma, highlighting the need for careful perioperative management in diabetic patients.*

Keywords: Inguinal Hernia, Lichtenstein Repair, Seroma, Diabetes Mellitus

INTRODUCTION

The lifetime probability of acquiring an inguinal hernia (IH) is 27% for males and 3% for females (1); however, this remains unclear. IHs are classified into lateral and medial categories. IHs in children are mostly lateral, while both subtypes exist in women as well as men. IHs usually become symptomatic, with surgery becoming the sole curative option (2, 3). IH recurrences were observed in 57% of cases within 10 years following initial surgical intervention. A portion of the remaining 43% of recurrences occurred considerably later, with certain cases arising more than 50 years after the initial Diagnosis (4). Chronic pain lasting over three months is a common issue following IH repair, affecting approximately 12% of patients (5). About 3% of the population experiences severe chronic pain coupled with long-term disability, which requires treatment (5).

The Lichtenstein repair approach transformed the treatment of IHs by means of a tension-free method that emphasises durable reinforcement of the weakened area (6). In contrast to traditional methods that relied on tension to close defects, which frequently resulted in elevated recurrence rates and patient discomfort, Lichtenstein repair utilises a synthetic mesh patch, typically composed of polypropylene, that strengthens the inguinal canal while reducing stress on adjacent tissues. Lichtenstein mesh hernioplasty is a widely accepted surgical intervention, mainly selected for its notably low morbidity (7, 8). Complications related to mesh hernioplasty are well-known. Potential complications consist of persistent pain, seroma formation, and mesh migration. The majority of surgeons avoid using mesh in emergencies (9, 10). Seroma often appears after closure of large indirect hernias. A study showed that the incidence of seroma formation among individuals receiving Lichtenstein repair for IH was 8.5% (11). Postoperative seroma formation following hernia surgery is an issue that may necessitate prolonged medical intervention and poses risks for infection as well as mesh displacement, potentially leading to hernia recurrence. This study aims to determine the frequency of seroma formation in patients undergoing Lichtenstein repair for IH at our hospital, given the limited local literature on the subject. The study's findings will help medical professionals develop strategies to mitigate complications and improve the overall quality of care for individuals undergoing IH repair.

METHODOLOGY

This descriptive study was conducted in the Surgery Department of Saidu Group of Teaching Hospital, Swat. The study duration was from August 13, 2024, to February 13, 2025, commencing after obtaining ethical approval from the hospital. The sample size consisted of 120 patients, calculated based on an anticipated frequency of seroma formation of 8.5% (11) in patients undergoing Lichtenstein repair, with a 95% confidence level and a 5% margin of error. Consecutive non-probability sampling was used. The study included patients of both genders aged between 18 and 65 years who had a confirmed Diagnosis of an inguinal hernia. For this study, an inguinal hernia was operationally defined based on a physical examination that identified a protrusion of abdominal contents through a weakness or defect in the abdominal wall of the inguinal area in patients who also presented with a burning sensation and pain in the groin region quantified as greater than three on a Visual Analogue Scale (VAS). Patients were excluded from the study if they had bilateral or complicated hernias, renal disease, liver disease, were pregnant or had an abnormal bleeding profile. Each patient gave their consent. Data were collected using a pre-designed structured proforma. Demographic details, including age, gender, body mass index (BMI), education level, profession, socioeconomic background, and residence, were recorded. A relevant medical history concerning smoking status, diabetes and hypertension was also recorded. All enrolled patients subsequently underwent Lichtenstein repair under general anaesthesia; in this procedure, a small incision was made near the hernia and the protruding tissue was pushed back into place. Then a mesh patch was

[Citation: Rehman, A., Akbar, F. (2025). Frequency of seroma formation in patients undergoing lichtenstein repair for inguinal hernia. *Pak. J. Inten. Care Med. 5(2), **2025**: 157*. doi: https://doi.org/10.54112/pjicm.v5i02.157]

placed over the weakened area to provide support and prevent the hemia from recurring. The outcome was seroma formation postoperatively, which was defined as being present in patients who reported pain (VAS > 3) and exhibited tenderness at the surgical site within a 30-day postoperative period. The Diagnosis was confirmed through physical examination by the observation of a swollen soft lump at the site of the surgical incision that discharged clear fluid. The entire process was evaluated by a consultant surgeon with a minimum of five years of post-fellowship experience. For data analysis, IBM SPSS version 27 was utilised. Age, height, weight and BMI were assessed using mean and standard deviation. Other demographic variables, including gender, socioeconomic status, educational status, profession, residence, hypertension, diabetes, and seroma formation, were evaluated in terms of frequency and percentage. The chi-square test was used to stratify seroma formation by demographics and comorbidities, with a notable P-value of ≤ 0.05.

RESULTS

The mean age of the patients in our cohort was 46.17 ± 13.84 years, with a mean Body Mass Index (BMI) of 26.35 ± 1.80 kg/m². The demographic profile showed a pronounced male majority with 113 (94.2%) male participants and 7 (5.8%) female participants. Concerning comorbidities, 96 (80.0%) patients were non-smokers. Hypertension was present in 38 (31.7%) patients. Around 18 (15.0%) patients in the study had diabetes (Table 1). Seroma formation was observed in 11 (9.2%) patients. The remaining 109 (90.8%) patients did not develop this complication (Table 2). The distribution of age, gender, education level, employment status, residence, socioeconomic status, BMI category, smoking status and hypertension was not significantly different between the groups with and without seroma formation ($p > 0.05$ for all). However, a statistically significant association was identified with diabetes mellitus. Among the 11 patients who developed a seroma, 8 (72.7%) had diabetes ($p < 0.05$) (Table 3).

Table 1: Demographic distribution of the patients and comorbidities

Demographics and comorbidities		n	%
Gender	Male	113	94.2%
	Female	7	5.8%
Education	Literate	48	40.0%
	Illiterate	72	60.0%
Profession	Employed	54	45.0%
	Unemployed	66	55.0%
Residence	Urban	68	56.7%
	Rural	52	43.3%
Socioeconomic status	Lower class	29	24.2%
	Middle class	75	62.5%
	Upper class	16	13.3%
Smoking	Yes	24	20.0%
	No	96	80.0%
Diabetes	Yes	18	15.0%
	No	102	85.0%
Hypertension	Yes	38	31.7%
	No	82	68.3%

Table 2: Frequency of seroma formation

Seroma formation	n	%
Yes	11	9.2%
No	109	90.8%

Table 3: Association of seroma formation with demographics and comorbidities

Demographics and comorbidities		Seroma formation				P value
		Yes		No		
		n	%	n	%	
Age groups (years)	18 to 35	1	9.1%	28	25.7%	P > 0.05
	36 to 50	3	27.3%	35	32.1%	
	51 to 65	7	63.6%	46	42.2%	
Gender	Male	10	90.9%	103	94.5%	P > 0.05
	Female	1	9.1%	6	5.5%	
Education	Literate	2	18.2%	46	42.2%	P > 0.05
	Illiterate	9	81.8%	63	57.8%	
Profession	Employed	5	45.5%	49	45.0%	P > 0.05
	Unemployed	6	54.5%	60	55.0%	
Residence	Urban	8	72.7%	60	55.0%	P > 0.05
	Rural	3	27.3%	49	45.0%	
Socioeconomic status	Lower class	3	27.3%	26	23.9%	P > 0.05
	Middle class	7	63.6%	68	62.4%	
	Upper class	1	9.1%	15	13.8%	
BMI (Kg/m2)	18.5 to 24.9	4	36.4%	24	22.0%	P > 0.05
	> 24.9	7	63.6%	85	78.0%	
Smoking	Yes	3	27.3%	21	19.3%	P > 0.05
	No	8	72.7%	88	80.7%	
Diabetes	Yes	8	72.7%	10	9.2%	**P < 0.05**
	No	3	27.3%	99	90.8%	
Hypertension	Yes	3	27.3%	35	32.1%	P > 0.05
	No	8	72.7%	74	67.9%	

DISCUSSION

The findings of our study indicate that seroma developed in about 9.2% of the patients. This Figure falls within the broad spectrum of rates reported in the existing literature. Naeem et al. found that no seroma formation developed in their study (12). Another study, conducted by Saeed et al., documented seroma formation in approximately 3.2% of patients (13). Awad et al. documented a 12.6% rate of seroma in their Lichtenstein repair group (14). Rahman et al. reported an even higher frequency of seroma formation in their

Lichtenstein repair group, which was approximately 15% (15). This variability is likely attributed to differences in surgical technique or patient selection criteria. For instance, the studies by Naeem et al. and Falah et al. reported a 0% seroma rate, which may reflect meticulous intraoperative hemostasis, the selective use of drains in high-risk cases, or perhaps a less sensitive method for detecting small, asymptomatic seromas (12, 16). On the higher end, Awad et al. reported a combined hematoma/seroma rate of 12.6% in their Lichtenstein group, which is closer to our finding and underscores the fact that fluid collections remain a common albeit often minor postoperative challenge (14).

A central and statistically significant finding of our analysis was the strong association between diabetes mellitus and the development of seroma formation. Patients with diabetes constituted 72.7% of the seroma group compared to only 9.2% in the non-seroma group. This relationship is biologically plausible but has not been a major point of emphasis in the hernia literature. Diabetes mellitus is known to impair microvascular circulation and delay wound healing. Abdellah et al conducted a study on hernia management between diabetics and non-diabetics. They reported that diabetic patients had notably higher duration of hospital stay, delayed healing of the wound and a higher rate of infection. They also noted that around 16.7% patients developed seroma formation in people with diabetes compared to 6.7% of the non-diabetic patients (17). This compromised healing environment could expose patients to reduced reabsorption of fluid in the dead space created by surgical dissection, thereby facilitating the formation of seromas. Our finding suggests that diabetes may be an important patient-specific variable to consider in preoperative risk stratification and postoperative management.

In contrast to diabetes, no other demographic or comorbid factors demonstrated a significant association with seroma development in our cohort. The mean age of our patients was 46.17 years. We observed that patients in the 51- to 65-year age group had a higher proportion of seroma formation, but the difference was not notable across age groups. The male predominance in our study (94.2%) is consistent with the well-established epidemiology of inguinal hernias, as reflected in various studies (13, 16).

The mean BMI of our cohort was 26.35 kg/m², placing the average patient in the overweight category. Although a higher BMI (>24.5 kg/m²) was identified as a significant risk factor for seroma after laparoscopic repair in the study by Xie et al., we did not find a statistically significant association in our open Lichtenstein repair cohort.

The most compelling finding of our research was the strong association between diabetes mellitus and an increased risk of developing a seroma. This suggests that surgeons should be particularly vigilant in managing diabetic patients undergoing hernia repair.

CONCLUSION

In conclusion, we observed that around 9.2% patients developed seroma formation after Lichtenstein repair for inguinal hernia. Diabetes was significantly associated with seroma formation.

DECLARATIONS

Data Availability Statement
All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department Concerned. (IRB-96/ERB/024)

Consent for publication
Approved

Funding
Not applicable

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTION

ATTIQUR REHMAN (Postgraduate Resident)
Conception of Study, Data Collection, Data Entry, Data Analsysis, Manuscript Drafting, Review of manuscript, and Final Approval of Manuscript.

FAZLI AKBAR (Professor)
Study Design,Conception Of Study, Supervision Of Entire Process, And Final Approval Of Manuscript.

REFERENCES

1. Primatesta P, Goldacre MJ. Inguinal hernia repair: incidence of elective and emergency surgery, readmission and mortality. Int J Epidemiol. 1996;25(4):835–839. https://doi.org/10.1093/ije/25.4.835
2. Yamaguchi N, Morioka D, Izumisawa Y, Toyoda J, Yamaguchi K, Horii N, et al. A classification system specific for recurrent inguinal hernia following open hernia surgery. In Vivo. 2021;35(6):3501–3508. https://doi.org/10.21873/invivo.12652
3. Shakil A, Aparicio K, Barta E, Munez K. Inguinal hernias: Diagnosis and management. Am Fam Physician. 2020;102(8):487–492. [No DOI assigned]
4. Köckerling F, Koch A, Lorenz R, Schug-Pass C, Stechemesser B, Reinpold W. How long do we need to follow-up our hernia patients to find the real recurrence rate? Front Surg. 2015;2:24. https://doi.org/10.3389/fsurg.2015.00024
5. HerniaSurge Group. International guidelines for groin hernia management. Hernia. 2018;22(1):1–165. https://doi.org/10.1007/s10029-017-1668-x
6. Gavriilidis P, Davies RJ, Wheeler J, De'Angelis N, Di Saverio S. Total extraperitoneal endoscopic hernioplasty (TEP) versus Lichtenstein hernioplasty: a systematic review by updated traditional and cumulative meta-analysis of randomised controlled trials. Hernia. 2019;23(5):1093–1103. https://doi.org/10.1007/s10029-019-01912-x
7. Yu M, Xie WX, Li S, Wang DC, Huang LY. Meta-analysis of mesh-plug repair and Lichtenstein repair in the treatment of primary inguinal hernia. Updates Surg. 2021;73(4):1297–1306. https://doi.org/10.1007/s13304-021-01045-2
8. Agarwal D, Bharani T, Fullington N, Ott L, Olson M, Poulose B, et al. Improved patient-reported outcomes after open preperitoneal inguinal hernia repair compared to anterior Lichtenstein repair: 10-year ACHQC analysis. Hernia. 2023;27(5):1139–1154. https://doi.org/10.1007/s10029-023-03092-3
9. Bakker WJ, Aufenacker TJ, Boschman JS, Burgmans JP. Lightweight mesh is recommended in open inguinal (Lichtenstein) hernia repair: a systematic review and meta-analysis. Surgery. 2020;167(3):581–589. https://doi.org/10.1016/j.surg.2019.09.035
10. Cabrera-Vargas LF, Mendoza-Zuchini A, Aparicio BS, Pedraza M, Sajona-Leguia WA, Arias JS, et al. Postoperative outcomes using Lichtenstein open hernioplasty versus Nyhus preperitoneal hernioplasty in inguinal hernia: a comparative analysis with 1-year follow-up. Health Sci Rep. 2023;6(3):e1151. https://doi.org/10.1002/hsr2.1151
11. Afzal AM, Ali RA, Yousaf SH. Outcomes of Desarda vs Lichtenstein repair for inguinal hernia in terms of operative time,

seroma formation, return to normal activity and cost. Pak J Med Health Sci. 2017;11(1):93–96.
12. Naeem M, Khan SM, Aman Z, Qayyum A, Jan WA, Mehmood K. Mesh repair of inguinal hernias. J Postgrad Med Inst. 2008;22(4):277–280.
13. Saeed N, Khanzada TW, Samad A. Outcome of Lichtenstein hernioplasty: a multicenter study. Rawal Med J. 2009;34(2):135–137.
14. Awad SS, Yallalampalli S, Srour AM, Bellows CF, Albo D, Berger DH. Improved outcomes with the Prolene Hernia System mesh compared with the time-honoured Lichtenstein onlay mesh repair for inguinal hernia repair. Am J Surg. 2007;193(6):697–701. https://doi.org/10.1016/j.amjsurg.2007.01.044
15. Rahman MKU, Sarwar N, Akhtar AN, Kaleem S, Mustafa H, Guizar MR. The obstructed hernia dilemma: Lichtenstein or darn? A comprehensive comparison of Lichtenstein vs Darn repair. J Univ Med Dent Coll. 2025;16(2):1057–1060. https://doi.org/10.37723/jumdc.v16i2.1138
16. Falah SQ, Jamil M, Munir A, Khan MI. Frequency of complications following Lichtenstein repair of inguinal hernia. Gomal J Med Sci. 2015;13(1):9–11.
17. Abdellah Ahmed MA, Hussain Z, Rashid NUA, Tanvir S, Khaliq M. Evaluating the impact of diabetes on hernia management by exploring pathologies and comorbidities in high-risk patients. Cureus. 2025;17(6):e86329. https://doi.org/10.7759/cureus.86329
18. Xie HY, Chen B, Shen J, Wang YP, Shen WC, Dai CS. Risk factors and clinical impact of seroma formation following laparoscopic inguinal hernia repair: a retrospective study. BMC Surg. 2024;24(1):274. https://doi.org/10.1186/s12893-024-02574-1