

Early Postoperative Pain in Mesh Fixation Versus without Fixation in Open Lichtenstein Mesh Hernioplasty

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ABSTRACT

Objective: To compare early postoperative pain in mesh fixation versus without fixation in open Lichtenstein mesh hernioplasty regarding early postoperative pain.

Methodology: A randomized control trial was done at the Department of Surgery of the Federal Government Services Hospital, Islamabad from April to December 2023. Total 60 patients meeting the inclusion criteria and were presented with inguinal hernia. Patients were randomly divided into two groups each consisting of 30 patients and were managed with Lichtenstein repair followed by either suture fixation for mesh or non-fixation of mesh. Patients from both groups were observed for 24-hours and early postoperative pain was recorded using visual analog scale (VAS). The data underwent analysis utilizing SPSS v 25.

Results: The mean age of the patients was 46.0±9.2 years. Among 60 patients, 36 (60%) men and 24 (40%) women. The average BMI was 26.34±4.27 kg/m². No significant difference was observed in postoperative pain between two groups ($p \geq 0.05$). A t-test was applied to compare the VAS score between two groups and it was observed the results insignificant except in patients with BMI less than 25 ($p \leq 0.05$).

Conclusion: There was no difference in occurrence of postoperative pain in fixed versus non-fixed mesh.

Keywords: Hernia, Inguinal; Herniorrhaphy; Lichtenstein; Pain; Surgical fixation; Surgical mesh.

Authors' Contribution:

^{1,2}Conception; ¹Literature research; ¹manuscript design and drafting; ^{3,4}Critical analysis and manuscript review; ^{5,6}Data analysis; Manuscript Editing.

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Introduction

Inguinal hernia is a frequently encountered issue in surgical practice. Inguinal hernias represent 75% of all hernias of abdominal wall, with 27% risk in men and 3% in women.¹ Due to its prevalence, surgical repair of inguinal hernias remains among the most frequent procedures in surgery.² The surgical techniques for hernia repair have significantly advanced and improved. Different authors have

advocated various methods, each with its own set of advantages and disadvantages.³

Edoardo Bassini was a pioneer in developing the first genuine anatomical repair for inguinal hernia, employing a technique that lowered both mortality and rate of recurrence to $\leq 2\%$.⁴ Nyhus and Stoppa developed tension free technique to reduce recurrence while Kugel adopted minimal access technique to reduce post herniorrhaphy pain.⁵ The

Lichtenstein technique has become the gold standard for open hernia repairs today. It is a tension-free repair that is easy to adopt and perform, and it has lower rate of recurrence. Nevertheless, patients who undergo hernioplasty using the Lichtenstein method can experience wound complaints and groin pain, which are often not fully reported.⁶ Currently, the main concern linked to the Lichtenstein method for inguinal hernia repair is pain, with a reported rate of occurrence is 15%-40%.⁷ The surgical method of minimal access for repairing inguinal hernias was introduced in early 1990s, coinciding with the establishment of laparoscopy in general surgery. It includes TEP (Totally extraperitoneal) approach, TAPP (Transabdominal Preperitoneal) method and IPOM (Intraperitoneal Onlay Mesh Repair).⁸ Several researchers have identified tension-free mesh repairing as the benchmark in inguinal hernia. Some studies have demonstrated that laparoscopic repairing is safe and effective. Laparoscopic repair provides patients with the benefits of minimal invasive surgery, and it's linked to rate of recurrence is comparable to that of traditional open tension-free mesh method.^{9,10} The laparoscopic method is more precisely demanding than the operation as openly, and it must be conducted under general anaesthesia. Another significant drawback is the instruments, mesh, and clip applicators cost. Some of the early postoperative complications of inguinal hernia surgery include wound hematoma, seroma, wound infection and postoperative pain.¹¹ This study was designed to compare mesh fixation and mesh without fixation in open Lichtenstein mesh hernioplasty regarding early postoperative pain.

Methodology

This randomized control trial was done at the Department of Surgery of Federal Government Services Hospital, Islamabad from April to December 2023 after approval from ethical committee of institute. Total 60 consecutive patients from 18 to 70

years, both male/female genders, having primary inguinal hernia were included in the study. The patients having unilateral or bilateral disease, direct or indirect, reducible and irreducible inguinal hernia were also included. WHO sample size calculator was applied to calculate the sample and the following parameters were used as; 95% confidence interval, alpha error 5%, power of test 80%, the mean pain score of mesh fixation and non-fixation groups was 5.9 ± 2.1 and 3.9 ± 1.8 points.¹² Patients with obstructed and recurrent inguinal hernias, uncontrolled diabetes and those having focus of infection e.g., urinary tract infection, abscess, sore throat, and patients with chronic chest conditions e.g., COPD were excluded. The data were selected through consecutive non-probability sampling method. All patients meeting the inclusion criteria were selected through consecutive non-probability sampling method.

The study's purpose and benefits were explained to all patient attendants, and those who agreed to participate provided written informed consent. Patients were randomized into group-A (Mesh hernioplasty) and group-B (Non-mesh hernioplasty) by blocked randomization by creating permuted blocks of 6 by computerized. A detailed medical history and clinical examinations followed by routine investigations were taken from all patients. Both procedures were performed under spinal anesthesia. After wound closure patients from both procedures were shifted to surgical ward. Patients from both groups were observed for 24 hours and early postoperative pain was recorded using visual analog scale (VAS). All patients were provided standard postoperative care as per protocols. Statistical analysis of data was performed using SPSS v 25. Mean and standard deviation were measured for numerical variables like age, BMI and VAS score. Frequency and percentage were computed in both groups for gender. Comparison of the two groups was done with respect to VAS score and independent t-test was utilized, and p-value ≤ 0.05 was measured significant. Mean VAS for pain was

stratified between age, gender and BMI for effect modifiers.

Results

Total 60 participants were enrolled and divided into two groups (n = 30) in each group in this study. One group was managed with mesh-fixation following Lichtenstein repair. The mean age of patients was 46.0±9.2 years. Among 60 patients, 36 (60%) men and 24 (40%) women. The average BMI was 26.34±4.27 kg/m². The demographics of patients were summarized (Table I). Independent t-test was applied to compare VAS score between two groups (Table II), yielding statistically insignificant results (p > 0.05). When VAS was stratified according to age, gender and BMI of study population, no statistically significant association of postoperative pain with age and gender. However, the significant association of VAS score with BMI in both groups was observed, with the difference in mean VAS score significant in those whose BMI was less than 25 kg/m² (Table III).

Table-I: Demographics statistics of all patients (n=60)

Variables		Mesh hernioplasty	Non-mesh hernioplasty
Ages (years)	Mean	47.4±9.2	44.6±9.2
BMI (kg/m ²)	Mean	26.1±4.0	26.6±4.6
Gender	Male (f, %)	18 (60%)	18 (60%)
	Female (f, %)	12 (40%)	12 (40%)

Table-II: Comparison of groups with respect to VAS score (n=60)

VAS score	Mesh hernioplasty	Non-mesh hernioplasty	p-value
At baseline	4.2±1.56	4.7±1.74	.251
Postoperative	1.56±0.29	1.32±0.32	.247

Table-III: VAS score stratified according to age, gender and BMI, (n=60)

Variables		Mesh hernioplasty	Non-mesh hernioplasty	p-value
Age	≤ 46 years	4.91±1.22	4.94±1.25	.94
	≥ 46 years	3.79±1.62	4.33±2.02	.44
BMI (kg/m ²)	≤ 25	3.85±1.82	5.44±1.51	.043
	≥ 25	4.47±1.33	4.38±1.77	.86
Gender	Male	4.11±1.68	5.06±1.59	.92
	Female	4.33±1.44	4.17±1.90	.81

Discussion

This study compared occurrence of early postoperative pain in mesh-fixation with no mesh fixation in Lichtenstein technique and found insignificant results between two procedures regarding postoperative pain following the procedure. A study found low pain in first week with non-suture fixation technique compared to suture fixation. However, significantly reduced in operation time was reported. While rarely measured, insignificant results found in duration of hospital stay and quality of life in fixation technique.¹³ Another study aimed to compare pain postoperatively and other complications following the application of ProGrip mesh versus conventional suture-fixed Lichtenstein methods. The researchers reported that statistically no difference in occurrence of pain, hematoma or seroma, wound infection, and recurrence rate. The mesh self-gripping was associate with shorter operation time (1–9 min).¹⁴ Another study which assessed the incidence and severity of pain, additionally impact on daily life, compared two techniques: "Lichtenstein method" with polypropylene fixed mesh with non-absorbed suture, and "Suture-less method" utilizing a partially absorbed mesh (lightweight mesh) secured with fibrin glue. The study reported no major complications or mortality.

7.8% of patients operated on with Lichtenstein technique experienced pain, while no patients in suture-less technique proved this feature. The researchers went on to conclude that the combination of lightweight mesh and fibrin glue results in significant better outcomes regarding postoperative pain and back to daily activities.¹⁵ Another study reported that the innovative idea of lower-density mesh of self-gripping should enable an effective intervention of inguinal hernia. This approach should decrease complications postoperatively and extent of necessary suture fixation, thereby enhancing the reproducibility of the method.¹⁶ In a study, patients underwent surgery with (SOFRADIM-France) mesh composed of lightweight isoelastic large pores knitted fabric that combined resorbed micro-hooks, providing self-gripping features to mesh during first month after fixation.¹⁷ Another study compared the findings of self-gripping mesh (GM) with sutured mesh (SM) in repair of inguinal hernia.¹⁸ A meta-analysis reported that insignificant difference in groin pain ($p = 0.23$) and rate of recurrence ($p = 0.59$). The operation time was significant lower in GM group ($p \leq 0.0001$). No significant difference was occurred between groups about hematomas ($p = 0.87$), infection ($p = 0.18$), discomfort ($p = 0.58$), and seromas ($p = 0.35$). The data indicated that GM was comparable to SM in repair of inguinal hernia.¹⁹

Conclusion

The study concluded that no difference in pain postoperatively following mesh fixation or non-fixation in Lichtenstein hernioplasty.

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