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COMPARATIVE STUDY OF POST OPERATIVE ASSESSMENT OF PAIN IN PATIENT WITH ILIOINGUINAL NERVE PRESERVATION Vs CUTTING IN CASE OF LICHTENSTEIN INGUINAL HERNIA REPAIR

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Abstract

Background: Inguinal hernia is a prevalent surgical condition, with Lichtenstein tension-free mesh repair being the standard treatment. However, chronic postoperative groin pain (PCP) remains a significant complication. Prophylactic ilioinguinal neurectomy has been proposed to reduce chronic pain, though concerns about sensory deficits persist.

Objective: To compare long-term neuralgia and paraesthesia outcomes following routine ilioinguinal nerve excision versus preservation in patients undergoing Lichtenstein inguinal hernia repair.

Methods: This prospective observational study was conducted at the Pacific Institute of Medical Sciences, Udaipur, over 20 months. Sixty-four male patients (aged 18–60 years) undergoing elective Lichtenstein hernioplasty were randomly assigned to two groups: nerve preservation (Group A) and prophylactic neurectomy (Group B). Outcomes assessed included postoperative pain, hypoesthesia, hyperesthesia, and activity-related discomfort. Statistical analysis was performed using SPSS 28.0.

Results: Group B (neurectomy) showed significantly lower rates of chronic pain at all follow-ups. By 3 months, all Group A patients were pain-free, while a few Group B patients reported mild residual pain. Group A had two cases of hypoesthesia and no hyperesthesia, while Group B had transient hyperesthesia that resolved by 3 months. Pain during walking, stair climbing, and vigorous activity was consistently lower and resolved faster in the neurectomy group. No significant differences were observed in other postoperative complications.

Conclusion: Prophylactic ilioinguinal neurectomy during Lichtenstein hernioplasty significantly reduces postoperative groin pain with minimal sensory impairment. It is a safe and effective strategy to enhance patient satisfaction and reduce chronic neuralgia, though informed consent regarding sensory changes is essential.

KEYWORDS: Inguinal hernia, Lichtenstein repair, Ilioinguinal nerve, Neurectomy, Chronic groin pain, Postoperative neuralgia, Sensory disturbance.

INTRODUCTION

Hernias have afflicted humans since antiquity, with references dating back to Hammurabi and the Egyptian Papyrus. Inguinal hernias, defined as the abnormal protrusion of tissue through a defect in the abdominal wall, are among the most common conditions globally, with a lifetime incidence of 18–24%.[1] Globally, inguinal hernias represent 75% of abdominal wall hernias, with over 20 million repairs performed annually. Approximately 750,000 repairs are done each year in the U.S., 100,000 in the U.K., and nearly 2 million cases are reported annually in India.[2]

If untreated, inguinal hernias can enlarge and result in life-threatening incarceration. Surgery is the standard treatment, with the Lichtenstein tension-free mesh repair—introduced by Dr. Irving Lichtenstein in 1984—remaining the gold standard, used in about 70% of cases. This technique leverages intra-abdominal pressure to

stabilize a mesh placed between the inguinal floor and the external oblique aponeurosis, avoiding the tension associated with sutures.[3]

Despite advances, chronic postoperative groin pain (PCP) remains a significant complication, affecting up to 62.9% of patients, with 10% reporting moderate to severe pain that impairs daily and sexual activities. Chronic pain may result from nerve trauma, fibrosis, or nerve entrapment, with consequences ranging from mild discomfort to psychological disorders. Pain may be neuropathic (from nerve injury) or nociceptive (due to mesh-related fibrosis or mechanical pressure).[4]

Traditionally, surgeons aimed to preserve the ilioinguinal nerve to prevent sensory loss, but elective neurectomy has gained traction for potentially reducing PCP. While neurectomy may cause numbness, studies show it can reduce chronic pain.[5]

Dittrick et al. found significantly lower chronic pain at six months in the nerve excision group (3% vs. 26%) with no significant difference in numbness. Picchio et al. reported similar pain rates (5% vs. 33%) but noted a significant increase in touch sensation loss in the division group.[6]

This study aims to compare long-term neuralgia and paraesthesia outcomes following routine ilioinguinal nerve excision versus preservation in Lichtenstein's repair, to establish the optimal surgical approach based on morbidity and patient satisfaction.

MATERIAL AND METHOD

A prospective, hospital-based observational study was carried out in the Surgery Department at the Pacific Institute of Medical Sciences (PIMS), Udaipur, after receiving ethical clearance. The study enrolled 64 male patients, aged 18 to 60 years, undergoing elective Lichtenstein inguinal hernia repair. Written informed consent was obtained from all participants. Patients were randomly assigned to either a nerve preservation group or a group undergoing prophylactic ilioinguinal neurectomy. Data collection spanned from April 20, 2023, to December 2024, with a total study duration of 20 months.

Inclusion Criteria: Eligible participants were male, between 18 and 60 years old, diagnosed with inguinal hernia through clinical examination and sonography, and scheduled for elective Lichtenstein repair.

Exclusion Criteria: Exclusion applied to individuals younger than 16 or older than 60, those with obstructed/strangulated or recurrent hernias, patients with immunocompromised states (e.g., HIV, diabetes), peripheral neuropathy, cognitive impairments, limited mobility, or female patients.

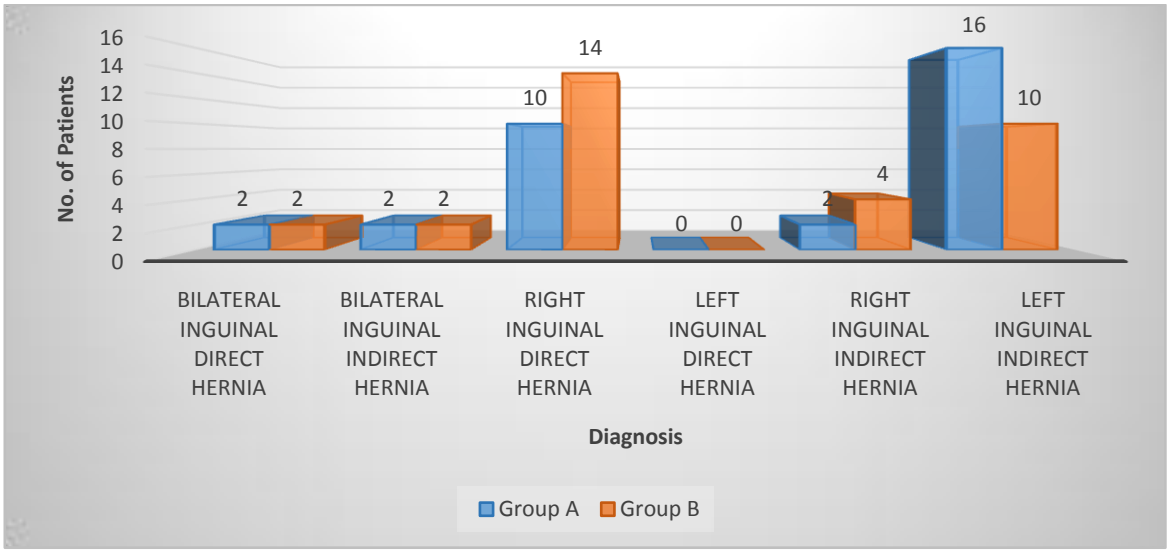
Sample: The primary outcome was the incidence of postoperative pain. Based on prior pain rates (28% in the neurectomy group vs. 64% in the nerve preservation group), and using standard sample size formulas ($Z_1 - \alpha/2 = 1.96$, $Z_1 - \beta = 0.84$, $p = 0.46$), the calculated sample size was 29 per group. Factoring in a 10% dropout rate, a total of 64 patients (32 in each group) were enrolled.

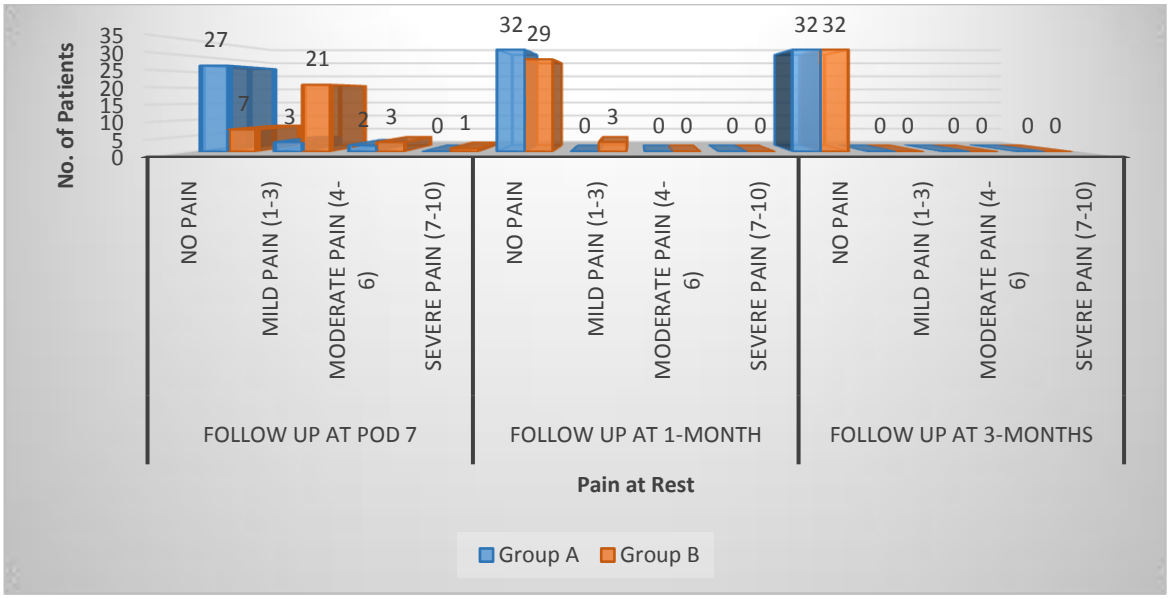
Statistical: Data were recorded in Excel and analyzed with IBM SPSS 28.0. Descriptive statistics, frequency, and percentages were used. Normality was assessed via the Shapiro-Wilk test. Parametric and non-parametric tests (t-test, Mann-Whitney U, Chi-square, or Fisher's exact test) were applied as appropriate. A p-value < 0.05 indicated statistical significance.

Method: Patients were randomized into two groups: one underwent ilioinguinal nerve preservation, while the other had nerve excision during hernia repair. Parameters Outcomes included hypoesthesia, postoperative pain, early and late complications, bleeding, hospital stay duration, and pain recurrence.

RESULT AND OBSERVATIONS

Figure: 1 Distribution of Cases by Diagnosis and Pain at Rest





The study population's mean age was 55.95 ± 15.61 years, with 37.5% aged 20–40 and 62.5% aged 41–60. Age distribution and mean ages were similar in Group A (55.51 ± 14.05) and Group B (54.4 ± 17.22), with no significant difference (p = 0.78). Diagnosis data showed both groups had similar hernia types, but Group A had more left inguinal indirect hernias, while Group B had more right inguinal direct hernias.

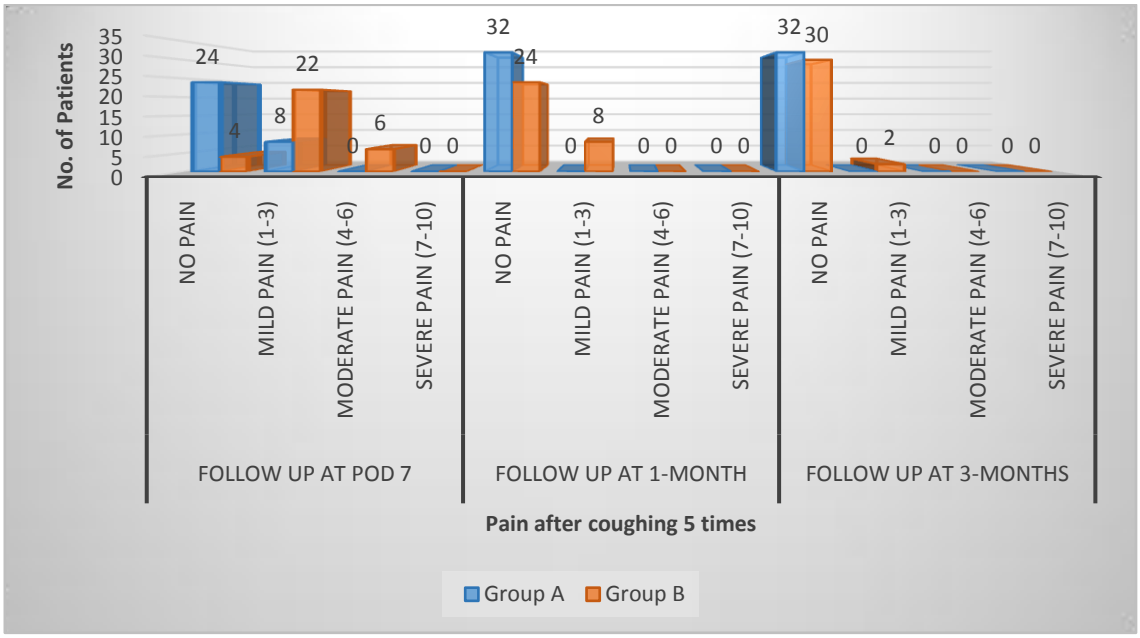
Table 1: Distribution of Cases According to Sensory Alterations Hypoaesthesia

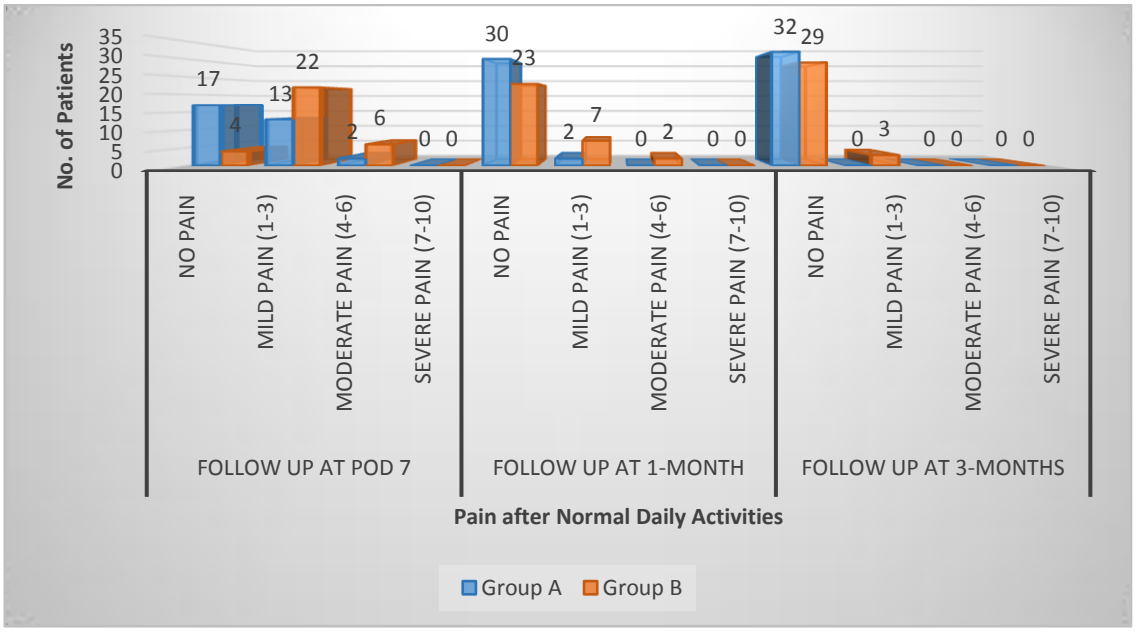
Hypoaesthesia		**Group A**		**Group B**		**P-Value**
		No. of Patients	Percentage	No. of Patients	Percentage	
Follow up at POD 7	Absent	30	93.75	32	100	0.5
	Present	2	6.25	0	0	0.5
Follow up at 1-Month	Absent	31	96.88	32	100	0.9
	Present	1	3.13	0	0	0.9
Follow up at 3-Month	Absent	31	96.88	32	100	0.9
	Present	1	3.13	0	0	0.9
Follow up at POD 7	Absent	32	100	29	90.63	0.07

	Present	0	0	3	9.38	0.07
Follow up at 1-Month	Absent	32	100	29	90.63	0.07
	Present	0	0	3	9.38	0.07
Follow up at 3-Month	Absent	32	100	32	100	1
	Present	0	0	0	0	1

At all follow-ups, Group B showed complete absence of hypoaesthesia. In Group A, 2 patients had hypoaesthesia on POD 7, reducing to 1 by 1 and 3 months. Hyperaesthesia was absent in all Group A patients throughout. In Group B, 3 patients had hyperaesthesia on POD 7 and 1 month, resolving completely by 3 months.

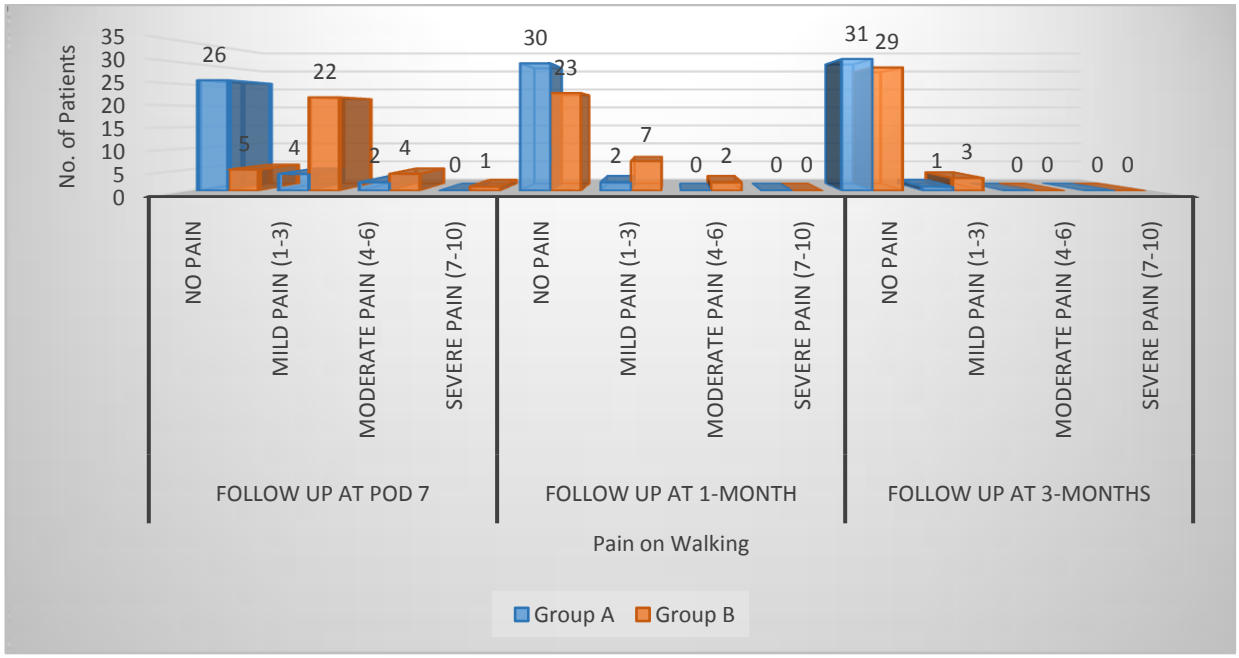
Figure 2: Distribution of Cases by Pain after Coughing and Daily Activities

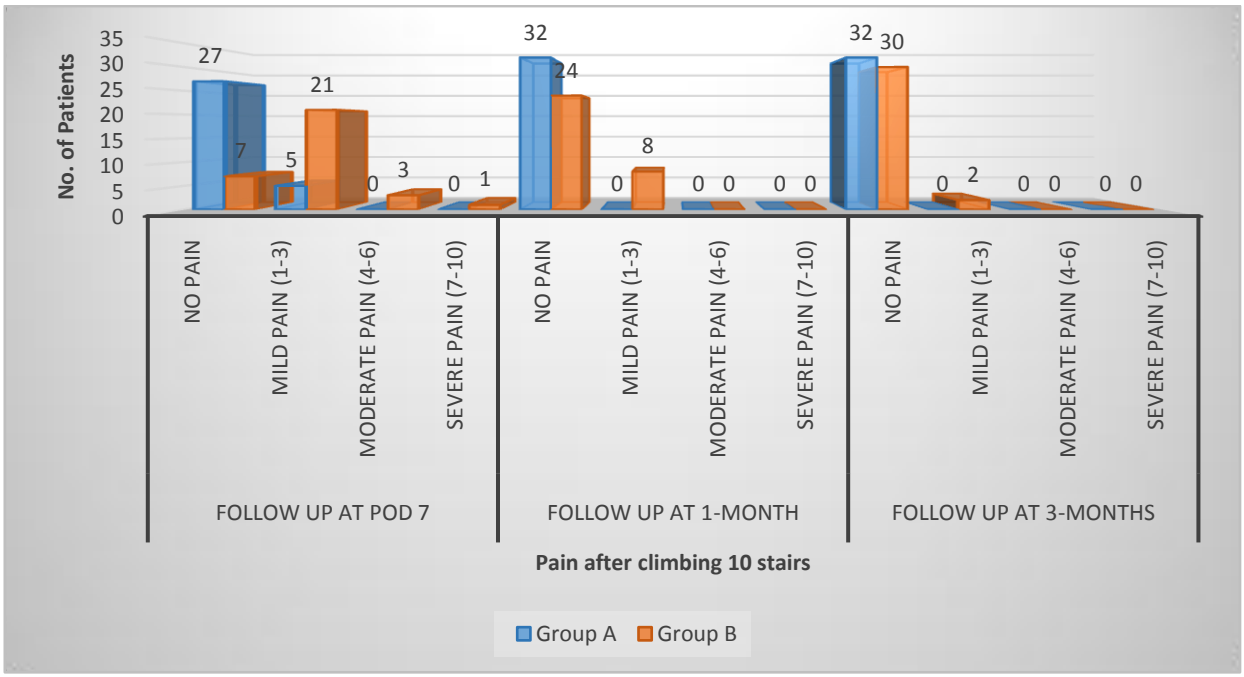




At follow-ups on POD 7, 1 month, and 3 months, Group A consistently reported better pain outcomes than Group B. Most Group A patients experienced no or only mild pain, with none reporting severe pain. By 3 months, all in Group A were pain-free. In contrast, Group B showed more cases of mild and moderate pain initially, though pain levels decreased over time, with a few still reporting mild pain at 3 months.

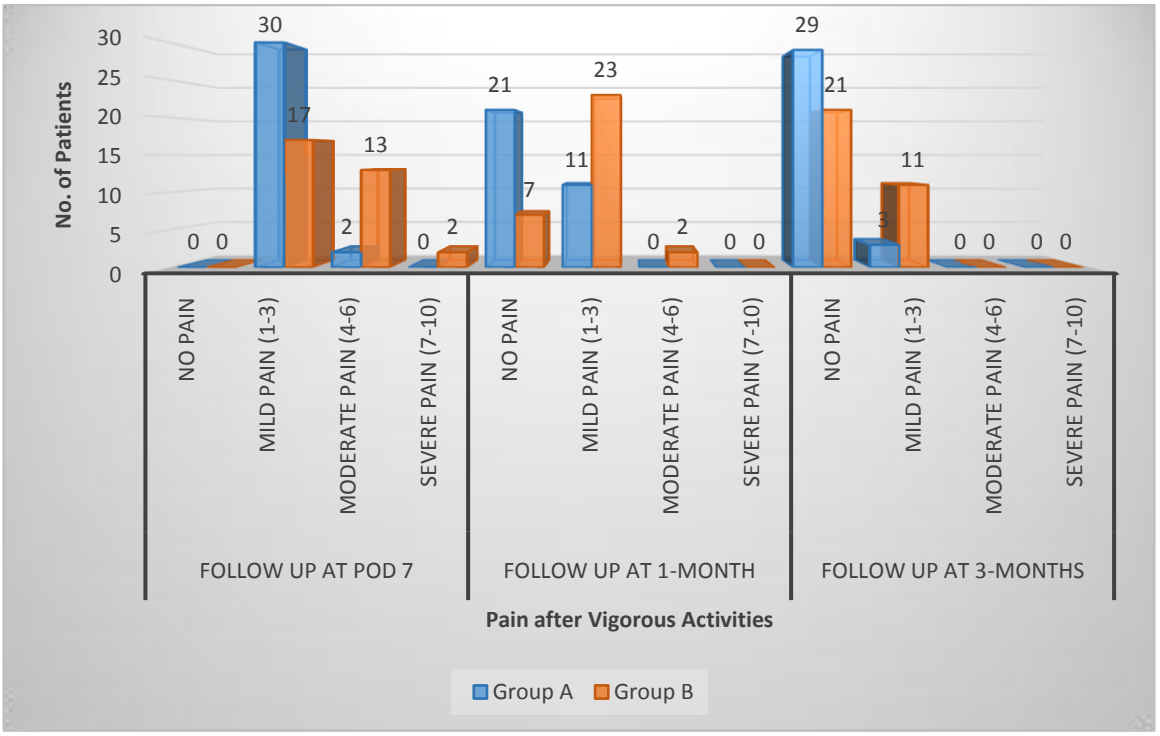
Figure 3: Distribution of Cases by Pain during Walking and After Climbing Stairs





At follow-ups on POD 7, 1 month, and 3 months, Group A consistently showed better pain outcomes than Group B during walking and stair climbing. By 3 months, nearly all patients in both groups reported no pain, but Group A achieved complete pain relief sooner. On POD 7, Group A had fewer cases of mild or moderate pain, with no severe pain, while Group B had more pain cases, including one severe. Pain steadily decreased across both groups over time.

Figure 4: Distribution of cases according pain after vigorous activity.



During follow-ups after vigorous activity, Group A consistently reported less pain than Group B. On POD 7, all patients in both groups experienced some pain, but Group A had fewer cases of moderate and no severe pain, unlike Group B. By 1 month, 21 patients in Group A had no pain compared to 7 in Group B. At 3 months, 29 in Group A and 21 in Group B reported no pain. Overall, Group A showed faster and greater pain resolution.

DISCUSSION

The ilioinguinal nerve (IIN), arising from T12–L1, courses near key abdominal structures but bypasses the deep inguinal ring. It exits the superficial ring to supply genital and thigh areas. Chronic postoperative inguinal pain (CPIP) occurs in up to 10% of hernia patients, possibly due to nerve injury or mesh-induced fibrosis. Mesh fixation and nerve proximity may cause inflammation or damage. Some advocate prophylactic IIN neurectomy to reduce CPIP. This study compares IIN preservation vs neurectomy after Lichtenstein repair.[7]

At the POD 7 follow-up, Group A showed superior pain management, with 27 patients reporting no pain at rest compared to just 7 in Group B. In response to coughing, 24 of Group A reported no pain, while only 4 in Group B did. By the 1-month follow-up, all Group A patients were pain-free, while 3 in Group B still had mild pain. By 3 months, both groups reported no pain, but Group A consistently had fewer pain instances throughout. Sethy M et al.[8] found that 8.5% of patients in the nerve preservation group experienced pain at rest after 6 months, compared to only 2.18% in the neurectomy group, although the difference was not significant. Amutha P et al.[9] reported fewer incidences of moderate/severe pain in the neurectomy group than in the preservation group. Mulkipatil et al.[10] concluded that pain was more severe in the nerve preservation group compared to the neurectomy group.

At the 7-day post-operative follow-up, 30 of 32 patients in Group A and all patients in Group B reported no hypoaesthesia. Group A had 1-2 patients experiencing hypoaesthesia at the 1-month and 3-month follow-ups, while Group B consistently showed no cases. Regarding hyperaesthesia, all patients in Group A were free from issues, but 3 patients in Group B experienced hyperaesthesia initially. Group B had no cases of hyperaesthesia at the later follow-ups. In Sethy M et al.[8], hypoesthesia incidence was 13.05% in the

neurectomy group and 4.3% in the nerve preservation group at 6 months, with no statistical significance. Hyperesthesia was similar at 1 month, but persistent hyperesthesia occurred in only 2 patients from the nerve preservation group at 6 months. Amuthan J et al.[11] found similar post-operative hypesthesia rates between ilioinguinal nerve preservation and excision.

At the 7-day follow-up, Group A showed 17 patients without pain, 13 with mild pain, and 2 with moderate pain. Group B had 4 without pain, 22 with mild pain, and 6 with moderate pain. At 1 month, Group A had 30 without pain, 2 with mild pain, and none with moderate or severe pain. Group B had 23 without pain, 7 with mild pain, and 2 with moderate pain. At 3 months, Group A had no pain, while Group B had 29 without pain and 3 with mild pain. Sethy M et al.[8] found that 8.52% of patients in the nerve preservation group reported pain during normal daily activities after 6 months, compared to 2.18% in the neurectomy group, though the difference was not significant. According to Wilfred Mui et al.,[12] a high incidence of pain was observed at the end of the first month in both groups (66% vs. 74.5%), but it significantly decreased by 6 months (0% vs. 2%).

At the 7-day follow-up, Group A had fewer reports of pain in walking, climbing stairs, and vigorous activities compared to Group B, who experienced more pain, especially during vigorous activities. By 1 month, Group A showed significant improvement, with most patients reporting no pain in all activities. Group B also improved, though some still experienced mild pain. By 3 months, Group A had no pain, while Group B showed continued progress with occasional mild pain. Sethy M et al.[8] found no significant difference in pain after moderate activity at 6 months between nerve preservation (8.52%) and neurectomy groups (2.18%). At 1 month, pain after vigorous activity was higher in the nerve preservation group, but by 6 months, the difference was significant ($P = 0.0096$). Sangolagi P et al.[13] reported significantly fewer patients in the neurectomy group experienced pain at 6 months ($p = 0.005$).

CONCLUSION

Our analysis found that prophylactic ilioinguinal neurectomy significantly reduced post-operative neuralgia compared to nerve preservation in patients undergoing Lichtenstein tension-free mesh hernioplasty. While some neurectomy patients experienced hypoesthesia, it did not affect daily activities. In contrast, a few nerve preservation patients reported hyperesthesia and mild pain-related limitations. The neurectomy group had lower rates of chronic groin pain postoperatively, with minimal sensory changes. Despite negligible differences in other complications, neurectomy is recommended to minimize chronic pain. Surgeons should discuss the benefits and risks of this approach with patients prior to surgery.

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