

COMPARATIVE OUTCOMES OF ILIOINGUINAL NERVE PRESERVATION VERSUS NEURECTOMY IN OPEN MESH INGUINAL HERNIA REPAIR: A PROSPECTIVE STUDY

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ABSTRACT

Postoperative pain remains a significant concern after open mesh inguinal hernia repair, with some patients experiencing persistent pain despite NSAIDs and opioids. This study compared ilioinguinal nerve preservation versus neurectomy in terms of postoperative pain and related symptoms. Male patients with uncomplicated unilateral inguinal hernias between the ages of 18 and 70 who were eligible for elective surgery were included in this study (mean age: Group I, 41 years; Group II, 44.7 years). Fifty patients were divided into two equal groups at random over the course of 6 months. Group I had an elective ilioinguinal neurectomy, while Group II had Lichtenstein mesh repair with the ilioinguinal nerve preserved. Individuals with bilateral or recurrent hernias, as well as those under the age of eighteen, were not included. Groin numbness, pain during daily activities, and persistent groin pain were assessed at 1 and 6 months after surgery. Among the 50 patients, each group included 16 patients with right-sided and 9 with left-sided unilateral inguinal hernia. Postoperative VAS pain scores at baseline, 1 month, and 6 months were significantly lower in the ilioinguinal neurectomy group than in the nerve preservation group ($P < 0.0001$) during normal activity, after rest, coughing, and walking. Immediately after surgery, groin numbness occurred in 4% of patients in both groups. At 1 month, mild groin numbness was reported in 20% of the neurectomy group and 32% of the nerve preservation group, increasing to 72% and 80%, respectively, at 6 months. Ilioinguinal nerve preservation during Lichtenstein mesh repair was associated with a higher incidence of chronic groin pain and postoperative groin numbness compared with prophylactic neurectomy.

KEYWORDS: Chronic postoperative pain; Hernioplasty; Ilioinguinal nerve; Ilioinguinal neurectomy; Inguinal hernia; Lichtenstein mesh repair

INTRODUCTION

Inguinal hernia is among the most common surgical conditions affecting men worldwide. Chronic postoperative groin pain, or inguinodynia, remains one of the most significant complications following inguinal hernia repair [1]. The causes include ilioinguinal nerve injury during surgical dissection, mesh-induced fibrosis and inflammation, and nerve entrapment or compression by sutures or surrounding scar tissue [2]. Chronic postoperative pain has been reported in 19%–69% of patients after inguinal hernia repair, with severe groin pain occurring in approximately 3% [1]. It is generally defined as pain persisting beyond the expected healing period of 6 weeks. The definition of chronic postoperative pain varies, with 3- and 6-month thresholds most commonly used [3]. Although earlier definitions considered pain persisting beyond 6 weeks as chronic, current consensus generally defines it as pain lasting at least 3 months, with some studies using a 6-month threshold [3].

The ilioinguinal nerve is commonly encountered during open inguinal hernia repair, as it runs beneath the external oblique aponeurosis [4]. Traditionally, the nerve is identified and preserved to maintain cutaneous sensation and minimize the risk of sensory deficits and chronic groin pain resulting from inadvertent nerve injury [4].

Chronic postoperative groin pain remains a major challenge for patients and healthcare providers, with significant effects on healthcare utilization, quality of life, and economic burden [5]. One proposed strategy to reduce this complication is routine prophylactic ilioinguinal neurectomy during inguinal hernia repair [6]. Prophylactic nerve excision has also been used in procedures such as axillary and neck dissections to reduce the risk of chronic neuropathic pain [7]. Routine prophylactic ilioinguinal neurectomy has been advocated to reduce chronic post-herniorrhaphy neuralgia by preventing potential pain-generating mechanisms, including nerve inflammation, entrapment, neuroma formation, and fibrosis [6]. However, the role of routine neurectomy remains controversial, and its widespread adoption is limited because of inconsistent evidence regarding its benefits and potential sensory consequences [8]. Consequently, various management algorithms and preventive strategies have been proposed to reduce the risk of chronic postoperative groin pain after inguinal hernia repair [9].

This study compared ilioinguinal nerve preservation with prophylactic neurectomy during Lichtenstein tension-

free mesh repair, assessing postoperative groin pain using the Visual Analog Scale (VAS) and groin numbness at baseline, 1 and 6 months postoperatively.

MATERIALS AND METHODS

The study was conducted in the Department of General Surgery at Bhaarith Medical College and Hospital (BMCH), Chennai, from January 2025 to June 2026. Patients admitted to the Department of General Surgery who underwent open hernioplasty during the study period were enrolled.

INCLUSION CRITERIA

- a. All male patients aged 18–70 years with unilateral inguinal hernia.
- b. Patients with uncomplicated unilateral inguinal hernia who were fit for elective surgery and had good performance status.
- c. Patients who provided written informed consent to participate in the study.

EXCLUSION CRITERIA

- a. Female patients with inguinal hernia.
- b. Patients with bilateral or complicated inguinal hernias, including obstructed or strangulated hernias.
- c. Patients with a history of previous abdominal surgery.
- d. Patients with significant comorbidities, including diabetes mellitus, cardiac disease, or chronic kidney disease.
- e. Patients with a history of peripheral neuropathy.
- f. Patients considered medically unfit for surgery.

Fifty patients were enrolled and allocated into two equal groups of 25 based on odd- and even-numbered hospital admissions. Written informed consent was obtained from all participants before surgery. All patients underwent standard Lichtenstein tension-free mesh hernioplasty according to the technique described by Lichtenstein et al. [10]

In Group 1 ($n = 25$), the ilioinguinal nerve was identified beneath the external oblique aponeurosis and prophylactically excised from the deep inguinal ring to its entry into the rectus muscle. The excised nerve was submitted for histopathological confirmation. In Group 2 ($n = 25$), the ilioinguinal nerve was identified and preserved throughout the procedure. In both groups, a 7×15 cm polypropylene mesh was positioned over the posterior wall of the inguinal canal and secured with polypropylene sutures.

All patients were monitored postoperatively for pain and early complications, including wound infection, hematoma, and urinary retention. The primary outcomes were postoperative and groin pain and its impact on daily activities, including rest, routine activities, coughing, and walking, assessed immediately after surgery and at 1- and 6-month follow-ups. Groin numbness was evaluated as the secondary outcome.

CHRONIC POSTOPERATIVE GROIN PAIN

Pain persisting for more than 3 months after surgery was defined as chronic postoperative pain. Neuropathic pain was characterized by burning or shooting sensations along the distribution of the affected nerve. Pain severity was assessed using the Visual Analog Scale (VAS).

VISUAL ANALOG SCALE (VAS)

The VAS is a validated tool for assessing pain intensity. Patients rated their pain from 0 to 10, with 0 representing no pain and 10 representing the worst imaginable pain. Scores were categorized as mild (1–3), moderate (4–7), or severe (8–10).

GROIN NUMBNESS

Groin numbness was assessed by comparing sensory function on the operated side with the corresponding area on the contralateral normal side. The assessed regions included the groin, medial upper thigh, upper scrotum, and penile root. Pinprick testing was used to assess pain sensation, while a cotton wisp was used to evaluate light touch. Sensory changes were assessed at 1 and 6 months postoperatively.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel 2016 and analyzed using the GraphPad statistical calculator. The Student's *t*-test was used for parametric data, with a two-tailed $P < 0.05$ considered statistically significant.

RESULTS

During the 18-month study period, 50 patients with primary inguinal hernia underwent elective Lichtenstein tension-free mesh repair. Of these, 45 (90%) presented with inguinal hernias, while 5 (10%) had inguinoscrotal hernias. Right-sided and left-sided hernias were observed in 16 (32%) and 19 (38%) patients, respectively. Participants were aged 18–70 years and were equally distributed between the two groups. Baseline age was comparable between the groups (Group 1: 41.25 ± 13.37 years; Group 2: 44.76 ± 15.67 years; $P = 0.3984$).

Educational status was comparable between the two groups. In Group 1, 10 (40%) participants had primary school education, 10 (40%) had completed higher secondary education, and 5 (20%) were college graduates. Similarly,

in Group 2, 9 (36%) participants had primary school education, 12 (48%) had higher secondary education, and 4 (16%) had college education. Higher secondary education was the most common educational level in Group 2, while primary and higher secondary education were equally represented in Group 1 (Table 1).

Table 1: The educational status of participants

Education Level	Group 1 n (%)	Group 2 n (%)
Primary School	10(40)	9(36)
Higher Secondary School	10(40)	12(48)
College	5(20)	4(16)

The incidence of early postoperative complications was similar between the two groups. Hematoma occurred in 1 patient (4%) in Group 1 and 2 patients (8%) in Group 2, while urinary retention was reported in 2 patients (8%) and 1 patient (4%), respectively. Wound infection occurred in 1 patient (4%) in Group 1 and none in Group 2. None of these differences reached statistical significance (Table 2).

Table 2: Early postoperative complications in both study groups

Complications	Group 1 n (%)	Group 2 n (%)	Mean
Haematoma	1(4)	2 (8)	1.0
Retention of urine	2 (8)	1 (4)	1.0
Wound infection	1 (4)	0 (0)	1.0

Pain scores during different activities were compared between Group 1 and Group 2 at immediate postoperative, 1 month, and 6 months follow-up periods. After rest, Group 1 demonstrated significantly lower pain scores than Group 2 immediately after surgery (1.41 ± 0.14 vs. 2.24 ± 0.05 ; $P < 0.0001$), at 1 month (2.46 ± 0.14 vs. 2.10 ± 0.05 ; $P < 0.0001$), and at 6 months (0.29 ± 0.14 vs. 2.07 ± 0.08 ; $P < 0.0001$). Following coughing, pain scores were significantly lower in Group 1 immediately postoperatively (2.87 ± 0.16 vs. 3.20 ± 0.08 ; $P < 0.0001$) and at 1 month (2.30 ± 0.19 vs. 2.47 ± 0.11 ; $P = 0.0003$), whereas no statistically significant difference was observed at 6 months (1.20 ± 0.15 vs. 1.81 ± 0.07 ; $P = 0.13$). During walking, pain scores were comparable immediately after surgery (2.30 ± 0.29 vs. 2.31 ± 0.11 ; $P = 0.87$), but significant differences were observed at one month ($P < 0.0001$) and six months ($P < 0.0001$). For pain during normal activity, a significant difference was observed at 1 month, with Group 2 reporting lower pain scores than Group 1 (2.34 ± 0.09 vs. 3.42 ± 0.60 ; $P < 0.0001$) (Table 3).

Table 3: Comparison of pain at normal activity, after rest, coughing and walking among both groups

Pain							
Activity	Group	Immediate Postoperative		1-Month Follow-Up		6-Months Follow-Up	
		Mean±SD	P Value	Mean±SD	P Value	Mean±SD	P Value
Normal activity	Group 1	-	-	3.42±0.6	P	-	-
	Group 2	-	-	2.34±0.09	<0.0001	1.15±0.07	-
After rest	Group 1	1.41±0.14	P	2.46±0.14	P	0.29±0.14	P
	Group 2	2.24±0.05	<0.0001	2.1±0.05	<0.0001	2.07±0.08	<0.0001
After coughing	Group 1	2.87±0.16	P <	2.3±0.19	P =	1.2±0.15	P = 0.13
	Group 2	3.2±0.08	0.0001	2.47±0.11	0.0003	1.81±0.07	
After walking	Group 1	2.30±0.29	P = 0.87	2.33±0.13	P <	1.15±0.07	P <
	Group 2	2.31±0.11		1.99±0.18	0.0001	2.75±0.13	0.0001

Groin numbness was assessed using the monofilament test described by Bell JA. At baseline, most patients had no groin numbness, including 24 (96%) in Group 1 and 22 (88%) in Group 2. Mild numbness was observed in 1 (4%) patient in each group, while Group 2 also had 1 (4%) patient each with moderate and severe numbness. At the 1-month follow-up, the absence of groin numbness was observed in 19 (76%) patients in Group 1 and 15 (60%) in Group 2. Mild numbness was reported in 5 (20%) and 8 (32%) patients, respectively, while moderate numbness occurred in 2 (8%) and 1 (4%) patient. No patients in either group experienced severe groin numbness. At the 6-month follow-up, 18 (72%) patients in Group 1 and 20 (80%) in Group 2 reported no groin numbness. Mild numbness was present in 6 (24%) and 4 (16%) patients, respectively, while moderate numbness occurred in 1 (4%) patient in each group. No cases of severe groin numbness were observed in either group (Table 4).

Table 4: Post-operative groin numbness in both groups

Groin Numbness	Immediate Post OP				One Month Follow Up				Six Months Follow Up			
	No ne	Mil d	Moder ate	Seve re	No ne	Mil d	Moder ate	Seve re	No ne	Mil d	Moder ate	Seve re

	n (%)				n (%)				n (%)			
Group 1	24 (96)	1 (4)	0	0	19 (76)	5 (20)	1 (4)	0	18 (72)	6 (24)	1 (4)	0
Group 2	22 (88)	1 (4)	1 (4)	1 (4)	15 (60)	8 (32)	2 (8)	0	20 (80)	4 (16)	1 (4)	0

DISCUSSION

Chronic groin pain is a common long-term complication of open inguinal hernioplasty and may significantly impair quality of life [12]. This study compared inguinodynia and groin hypoesthesia following prophylactic ilioinguinal neurectomy versus nerve preservation during Lichtenstein tension-free mesh repair, with outcomes assessed at baseline, 1 month, and 6 months postoperatively.

Both groups were comparable regarding age and hernia type. Chronic postoperative pain at rest was significantly lower in the ilioinguinal neurectomy group at all follow-up assessments. Pain during coughing was significantly lower in the neurectomy group immediately after surgery and at 1 month, but the difference was not significant at 6 months. Although walking-related pain was comparable at baseline, it was significantly lower in the neurectomy group at 1 and 6 months. Similarly, pain during routine daily activities was significantly lower in the neurectomy group at 1 month.

In this study, at baseline, 96% of Group 1 and 88% of Group 2 had no groin numbness. By 1 month, 76% in Group 1 and 60% in Group 2 were free of numbness; mild numbness increased to 20% and 32%, respectively. By 6 months, 72% in Group 1 and 80% in Group 2 reported no numbness, with mild numbness at 24% and 16%.

Several studies have compared prophylactic ilioinguinal neurectomy with nerve preservation, although their findings have been variable. Dittrick et al., in a study of 156 patients, reported a significantly lower incidence of chronic groin pain at 6 months following prophylactic neurectomy compared with nerve preservation [13]. Similarly, Neogi et al. found no significant difference in early postoperative pain among 42 patients, with mean pain scores of 1.8 versus 1.5 on postoperative day 1 ($P = 0.1408$) and 1.25 versus 1.32 at 1 week ($P = 0.7161$), respectively [14]. However, late postoperative and chronic groin pain were significantly lower following neurectomy, with mean scores of 0.6 versus 1.05 at 1 month ($P = 0.0184$) and 0.25 versus 0.77 at 3 months ($P = 0.0335$), respectively [14]. Wantz GE similarly reported a lower incidence of chronic groin pain after prophylactic neurectomy in a series of 546 patients [15]. These findings are consistent with the present study, which also demonstrated reduced chronic postoperative groin pain following prophylactic ilioinguinal neurectomy compared with nerve preservation.

In contrast, Picchio et al., in a randomized study involving 813 patients, found no significant difference in the incidence of chronic groin pain between prophylactic ilioinguinal neurectomy and nerve preservation [16]. This contrasts with the present study, which demonstrated a lower incidence of chronic groin pain following prophylactic neurectomy.

The overall incidence of early postoperative complications in the present study was 12%, with hematoma and wound infection each occurring in 4% of patients. These findings are comparable to those reported by Bittner et al., who documented early postoperative complication rates of 15%–28% following inguinal hernia repair [17]. Simons et al. similarly reported a hematoma rate of approximately 16% and a wound infection rate of less than 5%, consistent with the present findings. Postoperative urinary retention occurred in 2 patients in Group 1 and 1 patient in Group 2, comparable to the low incidence reported by Shanmugaiah and Pandian among 110 patients undergoing inguinal hernioplasty [18].

LIMITATION

This study has several limitations. First, the 6-month follow-up period was insufficient to assess the long-term effects of prophylactic ilioinguinal neurectomy. Longer follow-up is warranted to evaluate persistent groin pain and patient-reported quality of life. Second, the small sample size and single-center design may limit the generalizability of the findings. Larger, multicenter randomized controlled trials with longer follow-up are therefore needed to establish the long-term safety and efficacy of prophylactic ilioinguinal neurectomy during open inguinal hernia repair.

CONCLUSION

Prophylactic ilioinguinal neurectomy during Lichtenstein inguinal hernia repair was associated with a lower incidence of chronic postoperative groin pain without increasing morbidity, sensory disturbances, or impairment in quality of life. These findings suggest that prophylactic neurectomy may be considered during open mesh inguinal hernia repair.

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Ethical Approval: The study received approval from the Institutional Ethics Committee.

Disclosure: [HMI] and [KFK] conceptualized the study design; [KMV] and [HMI] drafted the original manuscript; [KMV] prepared the tables; and all authors ([HMI], [KFK], and [KMV]) critically revised the manuscript for important intellectual content, approved the final version for submission, and agree to be accountable for all aspects of the work.

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