

## A Study for Short Term Neurosensory Effects of Prophylactic Ilioinguinal Neurectomy during Lichtenstein Repair of Inguinal Hernia.

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**Abstract:** Chronic inguinodynia is one of the major problem arising after mesh hernioplasty leading to patient discomfort. The mechanism seems to be injury by suture, adherence to overlying implanted mesh, or involvement by scar tissue. Ilio-inguinal neurectomy during Lichtenstein hernioplasty may offers prophylaxis to such devastating pain. Our study aims to study the short term neurosensory effects of prophylactic ilioinguinal neurectomy during Lichtenstein repair of inguinal hernia. **Methods and Material:** This prospective observational study was conducted in thirty male patients aged 18-80 years who presented with inguinal hernia for elective Lichtenstein hernia repair. Postoperatively patients were assessed for pain, temperature, tactile sensation and numbness on day 1, 7 and 30 after surgery. Severity of pain was assessed by Visual Analogue Scale. **Results:** Postoperatively mild pain was observed in 19(63.33%) patients and moderate pain was observed in 11(36.63%) on day 1 post neurectomy. At 1 month post surgery 3(9.99%) patient complained of mild pain in groin region. There was no loss of temperature and pain sensation in any patient. Three (9.99%) patients experienced loss of touch sensation in the area of supply of ilioinguinal nerve on Semmes-Weinstein Monofilament (SWM) test, at post operative day 1 and 7. Out of which 2 patients regained their sensation to touch while one patient had persistent loss of sensation. **Conclusion:** prophylactic neurectomy of the inguinal nerves at the time of herniorrhaphy may decrease the incidence of post incisional neuropathy.

Date of Submission: 04-01-2019

Date of acceptance: 19-01-2019

### I. Introduction

Lichtenstein hernia repair is one of the commonest operation performed worldwide for inguinal hernias. Chronic inguinodynia is one of the major problem arising after mesh hernioplasty with incidence ranging from 19.0% to 62.9%.<sup>[1]</sup> These patients usually present with groin pain for varying length of time. While most patients report pain immediately after their inguinal operation, a delay in onset of symptoms from a few weeks to several years is seen in some cases. The most frequently entrapped nerves are ilioinguinal and iliohypogastric. The mechanism seems to be injury to nerves by suture, adherence to overlying implanted mesh, or involvement by scar tissue. Chronic inguinodynia may impact patient satisfaction, society cost and overall quality of life of patient. Ilio-inguinal neurectomy during Lichtenstein hernioplasty may offers prophylaxis to such devastating pain.

The most successful method available to relieve post incisional pain is surgical resection of the involved nerves with reasonably good long-term pain relief. It is occasionally stated that prophylactic neurectomy of the inguinal nerves at the time of herniorrhaphy, especially with mesh prostheses, will prevent post incisional neuropathy. But the neurectomized patients frequently developed annoying and occasionally disabling numbness. This is not a frequent complaint when neurectomies are done for pain symptoms, since most, if not all, patients are happy to trade numbness for pain relief.<sup>[2]</sup>

### II. Subjects and Methods

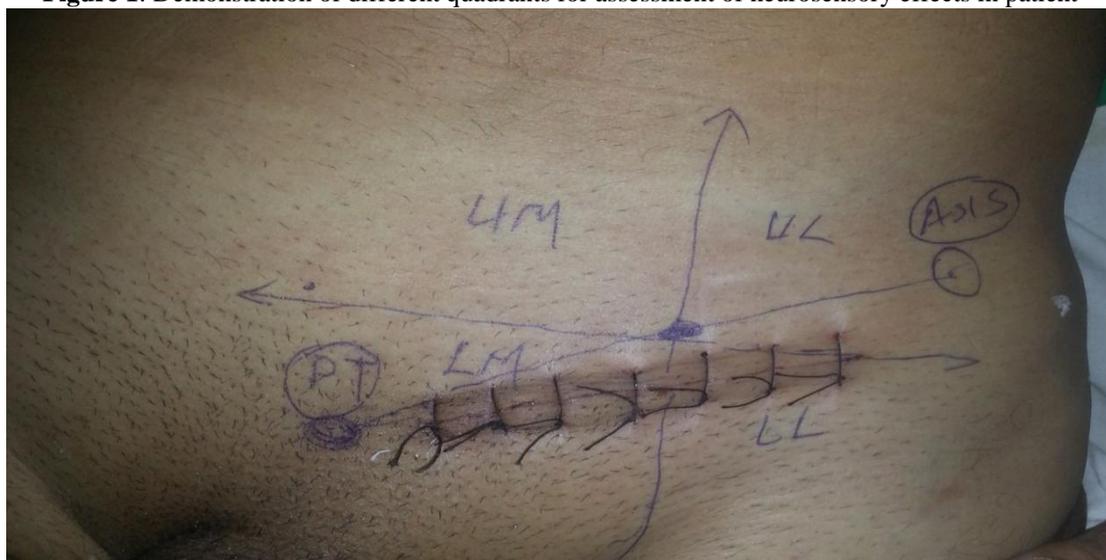
After approval from the institutional ethics committee the prospective observational study included thirty male patients aged 18-80 years presenting with inguinal hernia which were hospitalized for elective Lichtenstein hernia repair. The female patients, irreducible or strangulated hernias (complicated hernias), patients who were previously operated for contralateral hernia, recurrent hernias, previous history of abdominal

surgery, bilateral inguinal hernias, patients with peripheral neuropathy, limited mobility and patient with known psychiatric disorder were excluded from study. Lichtenstein mesh hernioplasty was done by standard procedure as described by Lichtenstein.<sup>[2,3,4]</sup> Ilio-inguinal neurectomy was performed in these patients by standard surgical procedure.<sup>[5]</sup>

A detailed clinical history and examination was performed in all the patients. Preoperatively patients had undergone measurement of pain intensity by Visual Analogue Score (VAS) after walking about 50 meters. Similarly a preoperative assessment of touch sensation was done by Semmes-Weinstein Monofilament and pain sensation was assessed by pin prick method and temperature sensation by hot and cold water filled test tubes.

The groin region was divided into 5 cutaneous areas- upper lateral, lower lateral, upper medial, lower medial, and scrotal region in relation to the mid inguinal point, a horizontal and a vertical line was drawn at this point All the areas were assessed 4 cm from point of interception for sensory assessment (figure 1).

**Figure 1:** Demonstration of different quadrants for assessment of neurosensory effects in patient

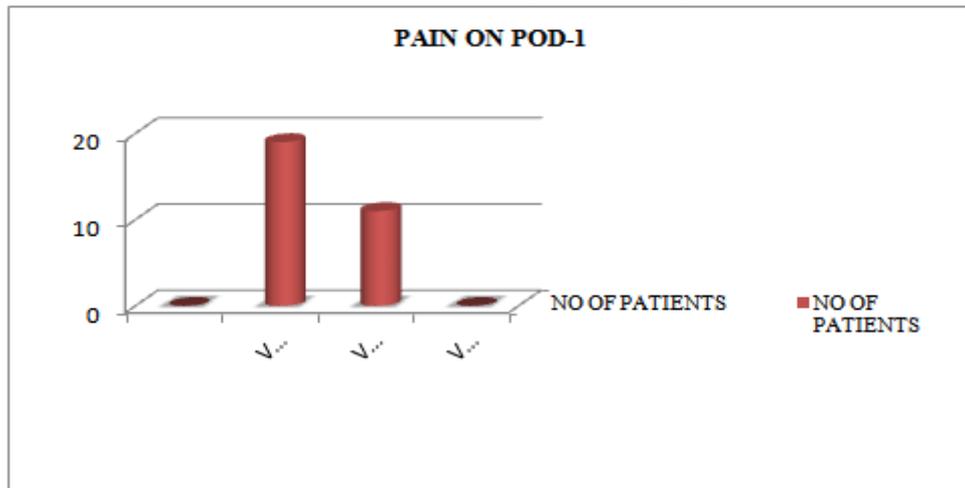


The non operative side of each individual acts as the control. All the patients were assessed on post operation day (POD) 1<sup>st</sup> and 7<sup>th</sup> and 1 month after surgery for pain sensation, intensity of pain, touch sensation, temperature sensation, numbness respectively. Pain was assessed by safety pin. We used a common safety pin bent at right angles so its clasp may serve as a handle. Intensity of pain was assessed by Visual Analogue Score after walking about 50 meters. According to this scale VAS=0 was considered as no pain, VAS 1-3 was considered as mild pain, VAS 4-6 was considered as moderate pain and VAS score of 6-10 was considered as severe pain with VAS=10 was considered as most severe pain. Asymmetry or touch sensation loss was assessed by the standard Semmes-Weinstein monofilament test in these 5 regions of each side by the technique described by Bell.<sup>[6]</sup> Temperature sensation was assessed with the test tubes containing warm and cool water. The temperature of water for testing cold sensation was 5°C to 10°C (41°F to 50°F), and for warmth, 40°C to 45°C (104°F to 113°F). We rated the sensation as present /absent comparing to other side with eyes open in supine position.

### III. Results

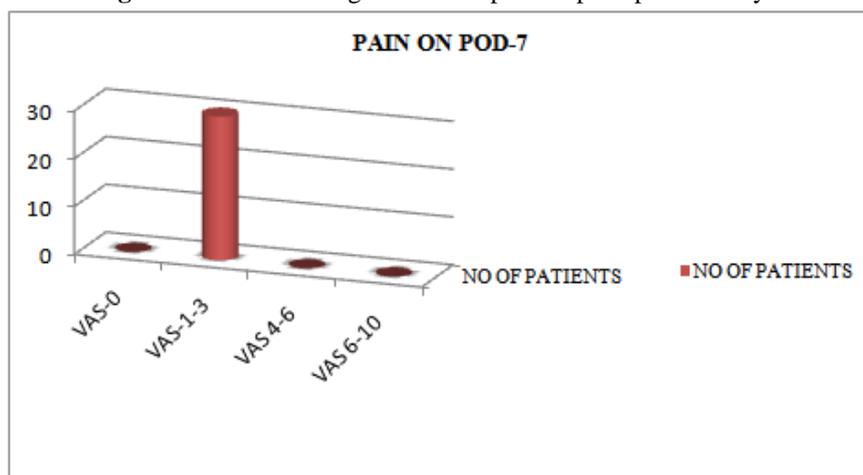
Age of the patients ranged from 18 to 78 years with mean age of 56.74 years. Out of 30 patients, 16 (53.28%) patients were found to have indirect inguinal hernia i.e. Nyhus-Type 2, 10 (33.34%) patients had direct inguinal hernia i.e. Nyhus Type 3A and 4(13.32%) patients had both direct and indirect inguinal hernia i.e. Pantaloon hernia i.e. Nyhus 3B. Twenty One (69.93%) patients had right sided inguinal hernia and 9 (29.97%) patients had left sided inguinal hernia. On first postoperative day, out of 30 patients, 1 (3.33%) patient had VAS =1, 18 (59.94%) patients had VAS=3 and 11 (36.63%) patients had VAS=4 (figure 2).

**Figure 2:** Visual Analogue Score of pain on postoperative day 1.



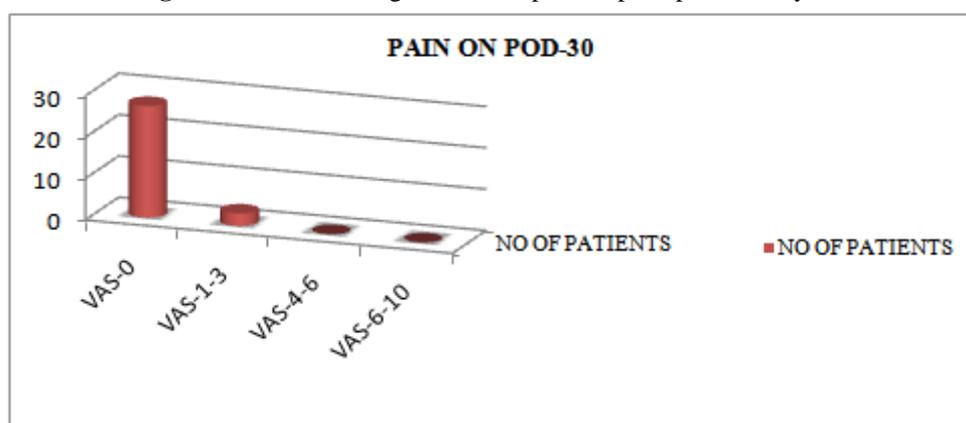
On Seventh postoperative day, 18 (59.94%) patients had VAS=1 and 12(39.96%) patients had VAS=2 (figure 3).

**Figure 3:** Visual Analogue Score of pain on postoperative day 7.



On 30<sup>th</sup> POD i.e. after 1 month of surgery, 27 (89.99%) patients had VAS=0, 2(6.66%) patients had VAS= 1 while 1 (3.33%) patient had VAS=3(figure 4).

**Figure 4:** Visual Analogue Score of pain on postoperative day 30.



Patient who had VAS =3 at 1 month postoperative period had VAS=2 on POD-7, i.e. pain had increased over time.

None of the patients experienced loss of pain sensation on pin prick, on post operative day 1, day 7 and at 1 month in any of the mentioned areas. None of the patients experienced loss of hot and cold sensation on using hot and cold water filled test tubes , on post operative day 1, day 7 and at 1 month in any of the mentioned areas. Only 3(9.99%) patients complained of numbness in groin area at post operative day 1 and 7 which recovered on day 30. Only 3(9.99%) patients developed any kind of neurosensory loss in form of loss of tactile sensation on Semmes-Weinstein Monofilament (SWM) test, in groin area on post operative day 1 and 7. Out of these three patients 1 patient develop loss of tactile sensation in lower medial area on post operative day 1 and day 7 which recovered on 30<sup>th</sup> post operative day i.e. at 1 month. One patient had similar loss of sensation in the same area on day 1 and day 7, which persisted at 1 month post surgery. One patient had loss of similar sensation on scrotal skin ipsilaterally, on post operative day 1 and 7 which recovered at 1 month post surgery.

#### **IV. Discussion**

In our study age of the patients ranged from 18 to 78 years with mean age of 56.74 years, which is nearly similar as that of study by Picchio et al, where it was 57 years in neurectomy patients.<sup>[7]</sup> Mean age of patients of prophylactic neurectomy group in a study conducted by Mui et al was 65.1 years.<sup>[8]</sup> Mean age of patients in study conducted by Ravichandran et al was 65.2 years.<sup>[9]</sup>

In our study of 30 patients, 16(53.28%) patients were found to have indirect inguinal hernia i.e. Nyhus Type 2, 10(33.34%) patients had direct inguinal hernia i.e. Nyhus Type 3A and 4(13.32%) patients had both direct and indirect inguinal hernia i.e. Pantaloon hernia i.e. Nyhus 3B. In study conducted by Picchio et al 542(67%) patients had indirect inguinal hernia, 243(30%) had direct and 28(3.5%) had mixed type of inguinal hernia.<sup>[7]</sup> In the study conducted by Malekpour et al 102(84%) patients had indirect inguinal hernias, 11(9%) patients had direct inguinal hernia and 8(7%) patients had mixed type.<sup>[10]</sup> In our study 19(63.27%) patients experienced mild pain (VAS=1-3), whereas 11(36.63%) patients had moderate pain (VAS=4-7) on post operative day one. On postoperative day 7 all the patients had mild pain (VAS=1-3). At 1month post surgery only 3(9.99%) patients had mild pain (VAS=1-3) whereas 27(89.99%) patients were pain free (VAS=0). In a study of 50 patients, conducted by Mui et al it was found that 5(10.6%) patients some sort of pain out of which 4(8.5%) patients had mild pain and 1(2%) had moderate pain.<sup>[8]</sup> In a similar study conducted by Dittrik et al 3(5%) patients from ilioinguinalneurectomy group experienced pain at one month post surgery.<sup>[11]</sup> In study of by Picchio et al, post operative pain was observed in 196(52%) in neurectomy group i.e. 128(34%) experienced mild pain,49(13%) patients had moderate and 19(5%) patients had severe pain at 1 month post neurectomy.<sup>[7]</sup>

In our study 3(9.99%) patients complaints numbness in groin i.e in the region of cutaneous supply of ilioinguinal nerve on post operative day 1 and 7, which recovered 1 month post surgery. In the study conducted by Ravichandran et al, 3(15%) patients experienced numbness on post operative day one.<sup>[9]</sup> Numbness in the area of innervation of ilioinguinal nerve was experienced by 18(9.42%) patients in a study conducted by Tsakayanni's et al, at 1 month post surgery.<sup>[12]</sup> In a study conducted by Dittrik et al, 13(20%) patients at 1 month post surgery experienced numbness.<sup>[11]</sup> In study by Picchio et al Incidence of numbness was 54(14%)<sup>[7]</sup> whereas incidence of numbness 1 month post surgery was 16(34%) in neurectomy group in a study conducted by Mui et al<sup>[8]</sup>

Loss of pain sensation on post operative day 1 was observed in 11(55%) of patients in a study conducted by Ravichandran et al.<sup>[9]</sup> In study by Picchio et al. it was observed in 211(56%) patients at 1 month post surgery.<sup>[7]</sup> In our study not even a single patient had similar sensation loss.

Sensory loss post neurectomy, on post operative day 1 was observed in 48(78.7%) patients in study conducted by Malekpour et al,<sup>[10]</sup> in 13(20%) patients in a study by Dittrik et al,<sup>[11]</sup> 26(55.3%) patients in study by Mui et al<sup>[8]</sup> and 2(1.04%) patients in study by Tsakayannis et al.<sup>[12]</sup> At 1 month post neurectomy had some sort of sensory loss, in the cutaneous territory of ilioinguinal nerve.<sup>[12]</sup> Loss of touch sensation was observed in 14(80%) of patients on day 1 post neurectomy in study by Ravichandran et al,<sup>[9]</sup> whereas 185(49%) patients had loss of touch sensation, in study by Picchio et al. at 1 month post neurectomy.<sup>[7]</sup>

Only 3(9.99%) patients developed any kind of neurosensory loss in form of loss of tactile sensation on Semmes-Weinstein Monofilament (SWM), Out of these three patients 1(3.33%) patient develop loss of tactile sensation in lower medial area, on Post Operative Day 1 and Day 7, which recovered on 30<sup>th</sup> post operative day i.e. at 1 month. Second patient had loss of similar sensation on scrotal skin ipsilaterally, on post operative day 1 and 7 which recovered at 1 month post surgery. Third patient had similar loss of touch sensation in the lower medial area on Day 1 and Day 7, which persisted at 1 month post surgery. This patient is under surveillance for long term neurosensory loss and inguinodynia.

## V. Conclusion

Chronic inguinodynia is one of the major complication of mesh hernioplasty. The ilioinguinal and iliohypogastric nerves are the most frequently entrapped. The most successful method available to relieve post incisional pain is surgical resection of the involved nerves with reasonably good long-term pain relief. It is occasionally stated that prophylactic neurectomy of the inguinal nerves at the time of herniorrhaphy, especially with mesh prostheses, will prevent post incisional neuropathy. Previously only a few studies had been done for the evaluation of neuro sensory changes post ilio-inguinal neurectomy done for prophylaxis of inguinodynia.

In our study, done to observe the short term neurosensory effect of ilioinguinalneurectomy in patients of Lichtenstein mesh hernioplasty, we found that neurosensory effects post neurectomy were negligible or short term if any. This may hints towards progressive compensation from adjacent nerve fibers of iliohypogastric or genitofemoral nerves.

There were some limitations in this study being the small sample size, this study was an observational study and had short period of follow up. Still ilioinguinalneurectomy may be considered as a valuable option in prophylaxis of inguinodynia in patients undergoing mesh hernioplasty.

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Som Raj Mahajan. "A Study for Short Term Neurosensory Effects of Prophylactic Ilioinguinal Neurectomy During Lichtenstein Repair of Inguinal Hernia." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 1, 2019, pp 42-46.