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Original Research Article

Ilio inguinal neurectomy in inguinal hernia

T. Mohanapriya*, T. R. Karthikeyan, K. Balaji Singh, T. Arulappan

Department of General Surgery, Sri Ramachandra Medical College, Porur, Chennai, Tamil Nadu, India

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***Correspondence:**
Dr. T. Mohanapriya,
E-mail: mohanapriya@gmail.com

ABSTRACT

Background: Inguinal hernia is one of the most common surgery done in any hospital. Chronic inguinal pain is one of the common problem these patients complain of. This study aims at evaluating the long-term outcomes of neuralgia and paraesthesia following routine ilioinguinal nerve division, compared to nerve preservation when performing Lichtenstein's inguinal hernia repair.
Methods: The present study is a randomized controlled trial of 60 cases of inguinal hernias admitted in General Surgery Department in our hospital. The patients were randomly chosen into Lichtenstein hernia repair with ilioinguinal neurectomy or Lichtenstein hernia repair with nerve preservation. After surgery, all patients were monitored carefully for pain and paraesthesia. Pain was assessed using visual analogue scale. Paraesthesia was assessed by the monofilament test and evaluated after comparison with the opposite side.
Results: In the present study, the incidence of pain as well as the severity of pain is far higher in the nerve preservation study group as opposed to the neurectomy study group. Hypaesthesia is not a significant complication following ilioinguinal neurectomy and does not significantly add to the morbidity of the patient.
Conclusions: Prophylactic neurectomy can be an appropriate solution in the prevention of chronic groin pain following Lichtenstein inguinal hernia repair and can be considered as an ideal inclusion into the standard hernia repair procedures. Hypoesthesia is not a significant complication following ilioinguinal neurectomy and does not significantly add to the morbidity of the patient.

Keywords: Inguinal hernia, Ilioinguinal nerve, Neurectomy

INTRODUCTION

"No disease of the human body, belonging to the province of the surgeon, requires in its treatment a better combination of accurate anatomical knowledge with surgical skill than Hernia in all its varieties", Sir Astley Paston Cooper. A hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity. The external abdominal hernia is the most common form, the most frequent varieties being the inguinal, femoral and umbilical, accounting for 75% of cases. Recently, with more attention to patient outcomes, chronic groin pain has replaced recurrence as the primary complication after open inguinal hernia repair. Several large series with systematic follow-up have reported pain rates ranging from 29% to 76%. Chronic pain following surgery has emerged as a common, and sometimes severe problem that can significantly affect a patient's, health-related, quality of life. Treatment is often difficult and challenging.

Inguinal hernia is one of the most common surgery done in any hospital. Chronic inguinal pain is one of the common problem these patients complain of.[1,2]

The present study was done with the aim to compare and correlate the therapeutic effectiveness of routine ilioinguinal neurectomy versus nerve preservation in Lichtenstein inguinal hernia repair with respect to chronic post-operative groin pain and post-operative paraesthesia.

METHODS

The present study is a randomized controlled trial of 60 cases of inguinal hernias admitted in General Surgery Department in our hospital. Sixty cases for the purpose of the study were selected on the basis of the random sampling method and after taking valid informed consent.

Inclusion criteria

all persons above 18 years of age; both direct and indirect inguinal hernias who undergo Lichtenstein Mesh Repair were included in the study

Exclusion criteria

- Recurrent hernias
- Hernia with complications like obstructed/strangulated hernia were excluded in the study.

The data was collected in a prepared proforma. The diagnosis of inguinal hernia was made by clinical examination. Preoperative evaluation included history and clinical findings. Routine lab investigations like Hb%, urine examination, RBS, serum urea and creatinine, HIV, HBsAg were done. Ultrasonographic evaluation of the abdomen was done in symptomatic patients above age 40 to look for prostatomegaly. X-ray and ECG were done for all patients for anesthetic evaluation.

Preoperatively, improvement of the nutritional status of the patient, when required was done. Any respiratory infection if present was treated. Abstinence from smoking/alcohol was advised. Patient was advised on appropriate breathing exercises.

The type of anesthesia used was regional anesthesia for all the cases. The patients were randomly chosen into Lichtenstein hernia repair with ilioinguinal neurectomy or Lichtenstein hernia repair with nerve preservation. All the Ilio inguinal nerve excised from the neurectomy group were sent to histopathology lab for confirmation. A single dose of preoperative broad spectrum antibiotic was given followed by the same for total of 3 doses postoperatively. Analgesics: injection Ketorolac was given postoperatively for 2 days and SOS later.

After surgery, all patients were monitored carefully for pain and paraesthesia. Pain was assessed using Visual analogue scale.

Paraesthesia was assessed by the monofilament test and evaluated after comparison with the opposite side. The patients were discharged when fit and were asked to come for regular follow up at 1 month, 4 months, and 8 months. There were 4 dropouts at end of 8 months. The patients were advised to return to pre-hernia lifestyle except lifting of heavy weights. Patients were evaluated for pain at rest, during normal activities and during vigorous activities at every follow up. The age/sex incidence, mode of presentation, surgical treatment, post-operative pain and paraesthesia were all evaluated.

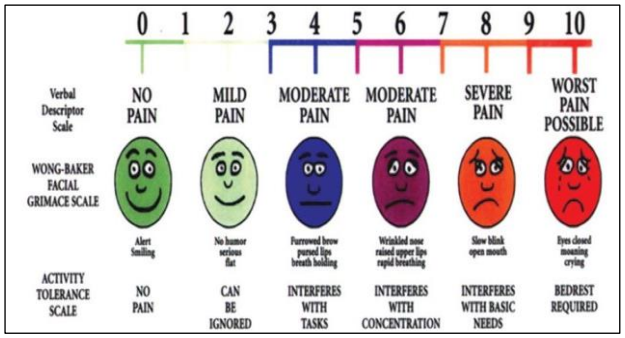

Figure 1: Visual analogue scale.

RESULTS

A total of 60 patients were taken for the study. These patients were randomized with 30 patients each in neurectomy and nerve preservation group.

Four patients did not come for follow up regularly after discharge and therefore, only one-month data were available for them. These patients were not considered in the results of the study. Rest of the patients were followed for a period of 8 months.

In the present study, the minimum age of the patient presenting with inguinal hernia was 18 years in the neurectomy group and 21 years in the nerve preservation group, while the oldest being 78 years in the neurectomy group and 72 years in the nerve preservation group.

Table 1: Age distribution.

Age at presentation	Neurectomy	Nerve preservation
<30	6	6
31-50	11	14
51-70	11	9
>70	2	1

In the present study, only one female patient was present in the neurectomy group.

Table 2: Sex incidence.

Sex	Surgery n (%)	
	Neurectomy	Nerve preservation
Male	29 (96.7)	30 (100)
Female	01 (3.3)	0
Total	30 (100)	30 (100)

In the present study, the incidence of right indirect hernia was the highest, being 40% in neurectomy group and

43.3% in nerve preservation group. The least was of left direct hernia.

Table 3: Diagnosis; type of Inguinal Hernia.

Inguinal hernia	Surgery n (%)	
	Neurectomy	Nerve preservation
Right direct	06 (20.0)	08 (26.7)
Left direct	05 (16.7)	03 (10.0)
Right indirect	12 (40.0)	13 (43.3)
Left indirect	07 (23.3)	06 (20.0)
Total	30 (100)	30 (100)

Pain at rest was present in 10% of the patients in nerve preservation group after 8 months (p=0.153) statistically insignificant.

Table 4: Pain at rest.

Pain at rest		Follow up n (%)		
		1 month	4 months	8 months
Neurectomy	Absent	28 (93.3)	29 (100)	26 (100)
	Present	02 (6.7)	0	0
	Total	30 (100)	29 (100)	26 (100)
Nerve preservation	Absent	27 (90.0)	27 (90.0)	27 (90.0)
	Present	03 (10.0)	03 (10.0)	03 (10.0)
	Total	30 (100)	30 (100)	30 (100)

P = 0.153 (insignificant)

Incidence of pain after normal daily activities was almost equal in both the study groups at 1 month follow up. Incidence of pain on normal daily activities was 11.5% in the neurectomy group and 26.7% in the nerve preservation group after 8 months. The difference in the incidence was found to be significant (p=0.001).

Table 5: Pain after normal daily activities.

Pain after normal daily activities		Follow up n (%)		
		1 month	4 months	8 months
Neurectomy	Absent	14 (46.7)	23 (79.3)	23 (88.5)
	Present	16 (53.3)	06 (20.7)	03 (11.5)
	Total	30 (100)	29 (100)	26 (100)
Nerve preservation	Absent	20 (66.7)	24 (80.0)	22 (73.3)
	Present	10 (33.3)	06 (20.0)	08 (26.7)
	Total	30 (100)	30 (100)	30 (100)

P=0.001(significant)

Incidence of pain after vigorous activity was almost equal in both the study groups at 1 month follow up. But the pain persisted in 11 patients in the nerve preservation group as opposed to 4 patients in the neurectomy group at 8 months follow up(p=0.004) statistically significant

Table 6: Pain after vigorous activity.

Pain after vigorous activity		Follow up n (%)		
		1 month	4 months	8 months
Neurectomy	Absent	15 (50.0)	24 (82.8)	22 (84.6)
	Present	15 (50.0)	5 (17.2)	4 (15.4)
	Total	30 (100)	29 (100)	26 (100)
Nerve preservation	Absent	13 (43.3)	15 (50.0)	19 (63.3)
	Present	17 (56.7)	15 (50.0)	11 (36.7)
	Total	30 (100)	30 (100)	30 (100)

P=0.004 (significant)

Table 7: Post-operative hypoaesthesia.

Post-operative Hypoaesthesia		Follow up n (%)		
		1 month	4 months	8 months
Neurectomy	Absent	22 (73.3)	23 (79.3)	23 (88.5)
	Present	08 (26.7)	06 (20.7)	03 (11.5)
	Total	30 (100)	29 (100)	26 (100)
Nerve preservation	Absent	30 (100.0)	30 (100.0)	30 (100.0)
	Present	0	0	0
	Total	30 (100)	30 (100)	30 (100)

Table 8: Post-operative hyperesthesia.

Post-operative Hyperesthesia		Follow up n (%)		
		1 month	4 months	8 months
Neurectomy	Absent	22 (73.3)	26 (89.7)	26 (100)
	Present	08 (26.7)	03 (10.3)	0
	Total	30 (100)	29 (100)	26 (100)
Nerve preservation	Absent	19 (63.3)	29 (96.7)	29 (96.7)
	Present	11 (36.7)	01 (3.3)	01 (3.3)
	Total	30 (100)	30 (100)	30 (100)

Incidence of hypoesthesia was 11.5% in the neurectomy group whereas it was 0 in the nerve preservation group at the 8 months follow up. Incidence of hyperesthesia was high in both the study groups a 1 month follow up. At 8 months follow up, only one patient in the nerve preservation group was found to have persistent hyperesthesia at the operated site.

In this study, the incidence of post-operative pain is equal among all age groups at end of 8 months.

Table 9: Age and post-operative pain.

Age	Pain	1 month		4 months		8 months	
		Neurectomy	Nerve preservation	Neurectomy	Nerve preservation	Neurectomy	Nerve Preservation
<30	Present	4	1	1	1	1	2
	Absent	2	5	5	5	4	4
30-50	Present	8	5	4	4	1	4
	Absent	3	9	7	10	10	10
50-70	Present	3	4	1	1	1	2
	Absent	8	5	10	8	8	7
>.70	Present	1	0	0	0	0	0
	Absent	1	1	1	1	1	1

Table 10: Type of hernia and post-operative pain.

Type of Hernia	Pain	1 month		4 months		8 months	
		Neurectomy	Nerve preservation	Neurectomy	Nerve preservation	Neurectomy	Nerve preservation
Direct	Present	2	1	1	1	0	1
	Absent	9	10	9	10	9	10
Indirect (incomplete)	Present	6	3	2	3	1	3
	Absent	4	7	8	7	7	7
Indirect (complete)	Present	8	6	4	2	2	4
	Absent	1	3	5	7	7	5

In this study, the comparison between type of hernia and post-operative pain showed patients with complete inguinal hernia had more incidence of pain than the other type of hernias in both the groups.

On summarizing the results:

- In the present study, the incidence of hernia was common in the younger age group, the highest being in the 31-50 years age group.
- Men were affected much more than women (1/60).
- Right indirect inguinal hernia was seen in 25 cases and therefore was the most frequent type observed in this study.
- In the present study 30 cases underwent Lichtenstein tension free hernia repair with prophylactic ilioinguinal neurectomy while 30 cases underwent Lichtenstein tension free hernia repair with ilioinguinal nerve preservation. Studied patients were randomly allocated into the two study groups, pre-operatively.
- Of the 60 patients, 4 dropped out of the study without any intimation and could not be persuaded to re-join the study, these patients belonged to the neurectomy study group. Therefore, only 26 patients of the original study group were present for complete follow up and evaluation in the neurectomy group whereas all the patients in the nerve preservation group were followed up as originally detailed.
- The incidence of pain at rest, was 10% in the nerve preservation group whereas it decreased to 0 in the neurectomy group at the end of 8 months.
- The incidence of pain following vigorous activity was 15.4% in the neurectomy group whereas it was 36.7% in the nerve preservation group at the end of 8 months.
- The incidence of pain on normal daily activities was 11.5% in the neurectomy group and 26.7% in the nerve preservation group at the end of 8 months.

- The incidence of hypoesthesia was 11.5% in the neurectomy group and 0 in the nerve preservation group at the end of 8 months.
- The incidence of hyperesthesia was 0 in the neurectomy group and 3.3% in the nerve preservation group at the end of 8 months.

DISCUSSION

The ilioinguinal nerve, although is a content of the inguinal canal, does not enter the canal through the deep inguinal ring. The ilioinguinal nerve arises from the 12th thoracic and first lumbar nerve (T12-L1).

It emerges from the lateral border of the Psoas major muscle just below the iliohypogastric nerve and passes obliquely across the Quadratus lumborum and Iliacus then perforates the transversus abdominus, near the anterior part of the iliac crest and communicates with the iliohypogastric nerve, between the Transversus and the Obliquus internus. The nerve then pierces the Obliquus internus (distributing filaments to it) just medial to the anterior superior iliac spine, at this point it becomes visible between the external and internal obliques and then it passes into the inguinal canal, accompanying the spermatic cord, through the subcutaneous inguinal ring.[3-5]

After leaving the superficial inguinal ring, the ilioinguinal nerve subdivides into:

- Large anterior scrotal or labial branches
- Small pubic branch to the lower pubic area and the base of the penis or clitoris
- Crural branches to the upper inner thigh and inguinal crease.[6,7]

In Lichtenstein tension-free repair, after reducing the sac, a sheet of polypropylene mesh measuring approximately 8×6 cm is trimmed to fit the area exposed and used to reconstruct the entire floor of the inguinal canal without any attempt to close the defect by suture.[8-12] The mesh is sutured, along its lower edge, to the pubic tubercle, the lacunar ligament and the inguinal ligament to beyond the internal ring, with polypropylene suture.

The superior edge is tacked down to the aponeurosis or muscle of the internal oblique, with a few interrupted sutures. The lateral edge of the mesh is slit and the two tails passed around to embrace the cord at the internal ring, these then are crossed over each other and tacked down to the inguinal ligament with one polypropylene suture. This creates a new internal ring and shutter mechanism.[13-1]

Chronic inguinal neuralgia is defined as “pain lasting for 3 months or more,” as per the International Association for the study of pain. Post-operative pain has been shown to persist for over 5 years in 1.8% of patients and as many as 7.5% of cases may be in more pain than before the operation.[16-18]

Diagnosis of neuralgia

- Neuropathic pain is characterized as an activity-induced sharp pain, located in proximity to the inguinal scar. The pain frequently radiates toward the scrotum, labium and/or upper inner thigh. Upper body stretching or twisting or stooping may cause pain from nerve traction or compression. Application of pressure where the nerve exits the inguinal canal may elicit tenderness in up to 75% of patients.[19,20]
- The neuropathic pain complex can also be reproduced by tapping the skin medial to the anterosuperior spine of the iliac bone or over an area of localized tenderness (Tinel’s test). A distinct trigger point situated in or close to the scar may cause pain following stimulation, e.g., after palpation.
- Signs of a disturbed neurophysiological equilibrium including hypoesthesia, hyperesthesia or allodynia in the region of the distribution of the nerve.
- Symptoms usually increase with hip hyperextension (patients walk with the trunk in a forward-flexed posture).
- Local infiltration of anesthetic, with or without steroid, should result in relief within 10 minutes.[21]
- Abdominal needle electromyography may be helpful in determining the severity of nerve injury, but electromyography is neither sensitive nor specific.

After an appropriate review of available literature and current guidelines and norms, the term neurectomy was applied to the removal of the whole length of the ilioinguinal nerve in the inguinal canal and this procedure was followed in the neurectomy study group.

The present study is a comparative study between prophylactic ilioinguinal neurectomy and ilioinguinal nerve preservation in Lichtentein inguinal hernia repair surgeries. The study was conducted with an intention to observe the effect of ilioinguinal neurectomy on the increase or decrease of the incidence of post hernioplasty chronic groin pain and paraesthesia, if any.

The patients were followed up in the postoperative period at intervals of 1 month, 4 months and 8 months. Patients were assessed for post-operative pain and paraesthesia with 4 drop outs occurring within the study period.

CONCLUSION

In the present study, it was found that chronic groin pain is a significant and debilitating complication following hernia repair. The incidence of pain as well as the severity of pain is far higher in the nerve preservation study group as opposed to the neurectomy study group.

This indicates that prophylactic neurectomy can be an appropriate solution in the prevention of chronic groin pain following Lichtenstein inguinal hernia repair and

can be considered as an ideal inclusion into the standard hernia repair procedures.

hypoesthesia is not a significant complication following ilioinguinal neurectomy and does not significantly add to the morbidity of the patient

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