

Original Research Article

Randomized control study of ilio-inguinal nerve preservation versus neurectomy in lichtenstein tension free mesh repair of inguinal hernia

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ABSTRACT

Background: Chronic post herniorrhaphy groin pain is defined as pain lasting > 3 months after surgery. Incidence of long term (= 1 year) post-operative neuralgia reported for Lichtenstein repair of inguinal hernia range from 6 - 29% Objective: To evaluate the effect of routine ilioinguinal nerve excision compared to nerve preservation on chronic groin pain and other sensory symptoms when performing lichtenstein inguinal hernia repair.

Methods: 100 patients, diagnosed as inguinal hernia and candidate for nonemergency open mesh inguinal hernioplasty repair were enrolled and divided into 2 groups. All patients underwent Lichtenstein tension free mesh repair. Post-operative follow-up was done on day 1, 3, 7, at 1 month, 3 months and 6 months.

Results: The incidence of post-operative severe pain was 36% versus 6% at POD-1, moderate pain 94% versus 22% at POD-3, moderate pain 78% versus 10% at POD-7 and no pain 8% versus 35% after 1 month of surgery respectively in the two groups. The incidence of post-operative hyperesthesia at groin in ilioinguinal nerve preservation group was 10%, 14%, 6% and 0% at POD-1, POD- 3, POD-7 and after 1 month respectively. Hyperesthesia was not observed in neurectomy group. Incidence of post-operative hypoesthesia and numbness at groin between the two groups at all post-operative follow up was found to be non-significant.

Conclusions: - The study revealed decreased incidence of chronic groin pain after surgery in neurectomy group. The procedure is not significantly associated with additional morbidities like hyperesthesia, hyposthesia and numbness.

Keywords: Ilioinguinal nerve, Inguinodynia, Neurectomy

INTRODUCTION

Hernias may be defined as “an abnormal protrusion of an organ or tissue through a defect in its surrounding walls.”¹ Chronic post herniorrhaphy groin pain is defined as pain lasting > 3 months after surgery, which is one of the most important complication occurring after inguinal hernia repair, occurs with greater frequency than previously thought.² Incidence of long term (= 1 year) post-operative neuralgia reported for lichtenstein repair of inguinal hernia range from 6 - 29%.^{3,4} A review of studies

published between 1987 to 2000 shows an overall incidence of 25% with 10% of patients having pain fitting definition of moderate or severe.⁵

Inguinodynia is the recommended generic term for chronic groin pain after hernia repair and should replace neuralgia or mesh inguinodynia to promote uniformity and avoid confusion in the literature.⁶ In cases that involves workman's compensation issue, treating a post-surgical patient becomes complicated. Although most legal cases results in out of court settlement, worth noting

is the fact that 5 - 7% of patients with post herniorrhaphy neuralgia will sue their surgeons.⁷

The concept of routine neurectomy in surgery is not unique to inguinal hernia repairs. Routine neurectomy is often performed during axillary and neck dissections in which the intercosto brachial and greater auricular nerves are sacrificed.⁸ Routine ilioinguinal nerve excision has been proposed as a means to avoid the troubling complication of long term post herniorrhaphy neuralgia.^{9,10}

Theoretically excision of ilioinguinal nerve would eliminate the possibility of inflammation neuralgia arising from entrapment, neuroma, fibrotic reactions yet controversies persists and the procedure is not widely accepted.^{11,12}

The purpose of the current study was to evaluate the effect of routine ilioinguinal nerve excision compared to nerve preservation on chronic groin pain and other sensory symptoms when performing lichtenstein inguinal hernia repair.

METHODS

The study was conducted on 100 patients having Uncomplicated inguinal hernia (both direct and indirect) aged above 18 years admitted in General Surgery Department, HSK Hospital and R. C. Navanagar, Bagalkot, Karnataka, India. Cases of congenital hernia, recurrent hernia, and complicated hernia like obstructed hernia, strangulated hernia and patients with preoperative inguinal pain of other aetiology were excluded.

Sample size was calculated using prevalence of post-operative pain to be 8%. Effective reduction of 25% was considered significant. Desired power was 80% with 95% confidence level. Hence, total sample size for the study was 100 (study arm-50, control arm-50).

The eligible participants were randomized into 2 groups using lottery method and data was collected in the pre tested proforma, which included the general information, clinical details of the patient. In study Group A, nerve was preserved, and in Group B neurectomy was performed. All patients underwent same type of surgery; lichtenstein tension free mesh repair, received uniform antibiotics and analgesics. Post-operative follow up was done personally on day 1, day 3, day 7, at 1 month, whereas at 3 months and at 6 months through telephonic conversation. The parameters studied were explained to patients with models in their vernacular language. Pain was graduated with a 4-point verbal-rank scale: none, mild, moderate or severe.

- Mild pain was defined as occasional or discomfort that did not limit daily activity, with a return to pre hernia lifestyle without the need of analgesics

- Moderate pain was defined as pain that interfered with return to normal everyday activities with analgesics rarely being needed
- Severe pain was defined as pain that incapacitated the patient, at frequent intervals, or interfered with everyday activities with frequent need of pain-killers.

Patients were asked to express agreement or disagreement on a 4-point verbal-rank scale. Daily activity included both physical and sports activities such as walking, lifting a bag of fruit, playing tennis, or jogging. The definition of the International Association for the study of pain regarding chronic pain (pain persisting beyond the normal tissue healing time, assumed to be 3 months) was used in this study. All the neurectomy patients' nerve specimen was sent for histopathological study confirmation.

Follow up

Patient follow-up, whether in the outpatient unit or by means of telephone calls, was always performed with the same 4-point verbal-rank scale. All patients with moderate to severe chronic pain were also submitted to a thorough clinical examination to exclude recurrence. The main endpoint of the study was evaluation of moderate to severe chronic pain at 6 months. Period of follow up being 6 months from the day of surgery, Parameters used for comparison were

- Pain (using 4 point verbal scale, 0- none, 1- mild, 2 - moderate and 3- severe)
- Hypoesthesia (0- absent, 1- present)
- Hyperesthesia (0- absent, 1- present)
- Numbness (0-absent, 1- present)

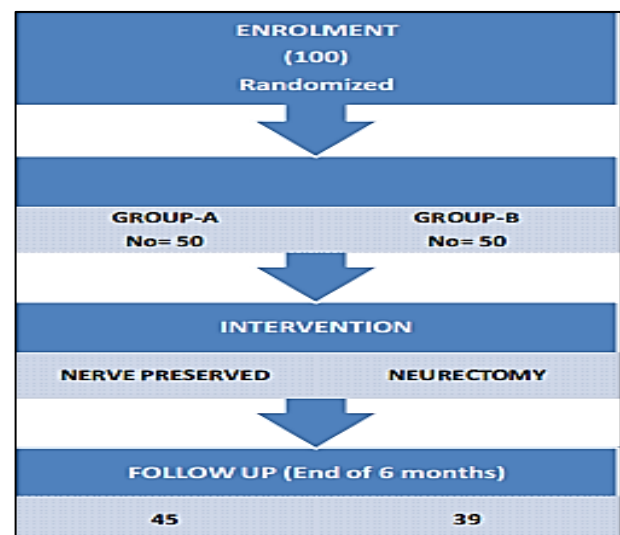


Figure 1: Consort diagram.

Data analysed by using SPSS 17software, Student t test and other appropriate statistical tests were applied.

RESULTS

In our study on 100 participants, 50 belonged to study group and 50 to control group. The age distribution was as follows 43% belonged to the 51 years above age group, 41% belonged to between 31- 50 age group and 16% were in younger group of less than 30 years. Majority of the participants were Farmer by occupation (62%), followed by businessmen (13%), labourers (11%) and others. At presentation 45% participants had hernia in inguinal region and 55% had in inguino-scrotal region. Out of which 5% of participants had bilateral inguinal hernia, 37 % had inguinal hernia in the left side and 58% had inguinal hernia in the right side. Among the total 100 study subjects, in 2% cases hernia were not reducible, 16% of the hernias were reduced by manipulation and in

82% cases hernia reduced spontaneously. Pain was present only in 20% cases. In 38% cases, hernia extended up to inguinal canal, 46% cases hernia extended up to root of the scrotum and in 16% cases hernia extended up to bottom of the scrotum. Visible peristalsis was observed in 10% participants. 20% cases had tenderness on palpation. Systemic complications like BPH (1%), asthma and COPD (1%) and cardiac diseases (3%) were observed. Following the hernia repair in the two groups, neurectomy being done in study group and ilio-inguinal nerve preservation in control group it was found that on day 1 post operatively post-operative pain in the inguinal region was significantly more ($P < 0.001$) in nerve preserved group compared to study group. Hyperaesthesia was observed in 5% of nerve preservation group and hypoaesthesia in 2% of neurectomy group.

Table 1: Post-operative pain, hyper/hypo aesthesia in study participants over 6 month study period.

			Neurectomy group	Nerve preserved group	Total	P-value
Day 1	Pain	Mild	14	2	16	0.000*
		Moderate	33	30	63	
		Severe	3	18	21	
	Hyperaesthesia	Present	0	5	5	0.024*
	Hypoaesthesia	Present	2	0	2	0.148
Day 3	Pain	Mild	39	2	41	0.000*
		Moderate	11	47	58	
		Severe	0	1	1	
	Hyperaesthesia	Present	0	7	7	0.007*
	Hypoaesthesia	Present	4	1	5	0.158
Day 7	Pain	Mild	42	11	53	0.000*
		Moderate	5	39	44	
		None	3	0	3	
	Hyperaesthesia	Present	0	3	3	0.086
	Hypoaesthesia	Present	3	1	4	0.293
1 month	Pain	Mild	14	32	46	0.000*
		Moderate	1	14	15	
		None	35	4	39	
	Hyperaesthesia	Present	0	0	0	0.003*
	Hypoaesthesia	Present	10	1	11	
3 month	Pain	Mild	2	33	35	0.000*
		Moderate	0	1	1	
		None	48	16	64	
	Hyperaesthesia	Present	0	0	0	0.001*
	Hypoaesthesia	Present	11	1	12	
6 month	Pain	Mild	1	11	12	0.000*
		None	38	34	88	
		Lost to follow up	11	5	16	
	Hyperaesthesia	Present	0	0	0	0.012*
	Hypoaesthesia	Present	0	0	0	

*Significant at $p < 0.05$, 95% CI.

During follow up it was noted that post-operative pain was significantly more in nerve preservation groups at post-operative day 3, 7, 1 month, 3 months and 6 months

with $P < 0.05$. Hyperaesthesia at inguinal region was more in nerve preservation group at only 3 and 7 days of follow up, with no hyperaesthesia thereafter.

Hypoaesthesia was seen in the neurectomy group from 1st day post operatively till 3 months of follow up but this was not found to be statistically significant. Numbness was not experienced by any participant in both groups.

DISCUSSION

Chronic pain following inguinal hernia repair is becoming a significant clinical problem, involving an increasing number of patients and surgeons, dealing with postoperative pain syndrome. Chronic pain irrespective of severity can significantly interfere with normal daily activity.¹³

Several explanations may be offered, namely, the low recurrence rates associated with the use of mesh repair that have shifted the hernia surgeons' attention from recurrence to other outcome parameters and the fact that patients today are more aware of pain syndromes.

The incidence of post-operative groin pain in the present study which compared ilioinguinal nerve preservation versus routine excision of ilioinguinal nerve estimated the following in the two groups; severe pain 36% versus 6% at POD-1, moderate pain 94% versus 22% at POD-3, Moderate pain 78% versus 10% at POD-7 and no pain 8% versus 35% after 1 month of surgery respectively. Whereas, there was no pain in 32% versus 96% after 3 months of surgery and no pain in 68% versus 76% after 6 months (16 patients missed the follow up) of surgery respectively. However, this did not hold good with Picchio and colleagues who suggested that nerve preservation and nerve division have similar incidences of pain and that intraoperative nerve division just leads to an increased rate of wound anesthesia.¹²

Pain was reported in 34.6% vs. 21.8% respectively at 1month which is comparable with study conducted by Dittrick et al 26.9% versus 12.5% at 3 months. This also correlates well with the study done by Fatemeh, 19.2% versus 8.2% at 6 months correlates well with studies done by Mui MB et al.^{9,14,15}

The incidence of post-operative hyperesthesia at groin obtained. In the present study did not show much significant difference when compared to the observations of Mui MB. He found post-operative hyperesthesia in Nerve preservation and nerve excision during surgery to be 66% versus 55% at post-operative 1 month and 42% versus 42% after 6 months of surgery respectively.¹⁵ The results of present study results were comparable with study conducted by Fatemeh, in which hyperesthesia was observed in nerve preservation and nerve excision during surgery in 78% versus 10% at POD-1, 12% versus 9% at post-operative 1 month and 2% versus 2% after 6 months of surgery.¹⁴

When the incidence of post-operative hypoesthesia at groin was compared with studies conducted by Mui et al,

nerve preservation and nerve excision during surgery showed, 66% versus 55% after 1 month, 42% versus 42% after 6 months respectively.¹⁵ Fatemeh, nerve preservation and nerve excision during surgery showed, 90% versus 78% 86 and at POD-1, 24% versus 18% after 1 month, 2% versus 2% after 6 months respectively.¹⁴

In the present study the incidence of post-operative numbness, ilioinguinal nerve preservation versus nerve excision, results showed 0% versus 2% at POD-7, 0% versus 2% at 1 month, and 0% versus 2% at 6 months. Which is lower when, compared with results of studies conducted by Picchio et al, in which numbness in two groups was as follows: 12% versus 14% at 1 month, 3% versus 5% at 6 months.¹² Another study conducted by Ravichandran et al, showed that, there is no significant difference between the two groups.¹⁰

CONCLUSION

The treatment of inguinal hernias has been undergoing metamorphosis over the last 30 years. The techniques for surgical repair have been shifting from tissue- and suture-based repairs to mesh-based reinforcement of the hernia defect. The research landscape has been shifting from recurrence rates, to determining cost-effectiveness, complication rates, rates of chronic pain and time to return to normal activity. It is becoming difficult to find areas of common ground among surgeons who are whetted to 1 repair technique or another with the exclusion of other techniques.

The present prospective comparative study revealed that, decreased incidence of chronic groin pain after surgery in neurectomy group. Furthermore the procedure is not significantly associated with additional morbidities. Hyperesthesia was not at all observed in neurectomy group compared to nerve preservation group. Hyposthesia and numbness was also not significant in both the groups. Although the study sample and follow up period is short in this present study than reported by many previous studies, it is still beneficiary to reduce the post-operative inguinodynia and not much difference is observed in terms of other morbidities.

Hence it is wiser to recommend, routine ilioinguinal neurectomy in patients undergoing inguinal hernia repair, when performing lichtenstein tension free mesh repair for inguinal hernia.

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