Original Research Article

Comparative study of preservation versus elective division of ilioinguinal nerve on chronic groin pain after lichtenstein tension free inguinal hernia repair

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ABSTRACT

Background: Post-hernioplasty chronic groin pain is one of the most important complications encountered after inguinal hernia repair. Routine ilioinguinal nerve excision has been proposed to avoid chronic post-hernioplasty neuralgia. The study aimed to evaluate the effect of routine ilioinguinal nerve excision compared to nerve preservation on chronic groin pain and other sensory symptoms in lichtenstein inguinal hernia repair.

Methods: The study was conducted in the department of general surgery, at S.P. Medical College and PBM Hospital, Bikaner for duration of 15 months from august 2018 to November 2019. A total of 60 patients of uncomplicated inguinal hernia, who met the inclusion criteria, planned for lichtenstein hernioplasty were randomly divided into 2 groups with 30 cases with ilioinguinal nerve preservation (group A) and 30 cases with elective division of the nerve (group B). Follow up was done upto 1 year and patients were inquired regarding pain, hypoesthesia and numbness and data was compared and analysed.

Results: The incidence of post-operative neuralgia was 23.33% vs 6.67% ($p=0.05$) at 1 year in group A and group B respectively. The difference in pain was significant in both groups. The incidence of post-operative hypoesthesia was 10% vs 16.67% ($p>0.05$) at 1 year follow up in group A and group B respectively. The incidence of numbness was 11.11% vs 16.67% ($p>0.05$) at 1 year in group A and group B respectively. No statistically significant difference was found in both groups.

Conclusions: The prophylactic excision of ilioinguinal nerve during lichtenstein mesh repair decreases the incidence of chronic groin pain after surgery.

Keywords: Chronic groin pain, Inguinal hernia, Ilioinguinal nerve, Lichtenstein repair

INTRODUCTION

A hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity.¹ Although a hernia can occur at various site of body, these defects most commonly involve the abdominal wall, particularly the inguinal region. 75% of all abdominal hernias are found in the groin; of all groin hernias, 95% are inguinal hernias and 5% are femoral hernia.² Inguinal hernias are 9 times more common in men than in women.²

Inguinal hernia is a common surgical condition requiring operative repair.³ Various techniques have been used for repairing inguinal hernias such as the Lotheissen, Cooper ligament repair or McVay repair, Bassini repair and Shouldice Repair but Lichtenstein tension free mesh repair is the gold standard.⁴

In the lichtenstein repair, a sheet of polypropylene mesh is applied to the inguinal canal. Its' most presenting complication, and a major cause of immobility and

departure from work, is post-operative chronic groin pain.⁵

Chronic post-hernioplasty groin pain is defined as pain lasting for more than 3 months after surgery. It occurs as a result of entrapment or nerve injury. Most commonly ilioinguinal nerve is involved.⁶ Pain may also be dependent on the method of fixation of mesh.⁷ Invalidating pain in hernioplasties can be caused by strangulation of muscle fibres or by the compression of the regional nerves, despite their tension-free nature, raising the concept of division of ilioinguinal nerve in elective procedure, leading to decreased postoperative pain.⁸ However, elective division of all these sensory nerves may reasonably lead to considerable sensory loss in the inguinal region.

Much controversy exists regarding the best management for the ilioinguinal nerve during hernia repair. Traditional surgical techniques dictate that the ilioinguinal nerve should be preserved at all times during repair because of the morbidity associated with cutaneous sensory loss and chronic groin pain following nerve injury. Elective division of the ilioinguinal nerve to reduce development of chronic post-hernioplasty pain has been recommended by some workers.⁹

Initially, it was recommended that nerve preservation helps in minimizing the postoperative pain after inguinal hernioplasty, while division of ilioinguinal nerve during this procedure, was found to be a factor for altered pain sensation.¹⁰

The purpose of this 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

This prospective study was conducted on 60 patients of inguinal hernia over a period of 15 months from august 2018 to November 2019 in the Department of General Surgery, at S.P. Medical College and PBM hospital, Bikaner.

Inclusion criteria

Patients admitted with uncomplicated inguinal hernia (direct and indirect) were included.

Exclusion criteria

Patients below 18 and above 60 years with diabetes mellitus, complicated inguinal hernias and recurrent hernias and previous surgery in the inguinal region and mesh allergy and subsequent hernia repair in the observation period and previous history of trauma and pain at the inguinal region were excluded from the study.

The data of all patients was collected in a prepared proforma which contained demographic information, history, clinical finding, routine investigations and post-operative follow-up outcome.

In group A, the ilioinguinal nerve was identified after carefully opening the external oblique fascia and protected throughout the operation. The nerve was seen following the spermatic cord lying over the ventral surface of the cremasteric sheath and exiting through the external ring. Extreme care was used during surgery to avoid inclusion of nerve tissue during suturing and mesh placement.

In group B, after identification and adequate exposure of the nerve, it was excised with an electrocautery about 1 cm lateral to deep ring and the distal segment of nerve was resected up to superficial inguinal ring. The cut ends were left alone without implantation into muscle or ligation. The rest of procedure was performed in a standardized manner.

The patients were all managed in a standard clinical pathway post-operatively and were followed up for pain, hypoesthesia and numbness at 1, 3, 7 day, 1, 3, 6 month and 1 year after operation.

Statistical method

In this study the results of the two groups were compared and analyzed by using Chi square test. The results were obtained, noted in the performa and data was analyzed on SPSS16.0 statistical software. Unpaired t- test was used to calculate p value. P value at 95% confidence level or <0.05 was taken as highly significant.

RESULTS

A total no of 60 patients of uncomplicated inguinal hernia who underwent lichtenstein mesh hernioplasty included for this prospective study, 30 cases with ilioinguinal nerve preservation (Group A) and 30 cases with elective division of the nerve (Group B).

The mean age of patients was 39.6 years in group-A and 41.2 years in group-B. The hernia was most common after 3rd decade of their life with male predominance. There were all males in group-A and in group-B, 96.7% were males and 3.3% females. Mostly, in group-A there were 46.7% heavy workers followed by 28.3% light workers and 25% were moderate workers. Similarly, in group-B 50% heavy workers followed by 26.6% light workers and 23.4% were moderate workers.

Mostly patients come with a complaint of swelling (approximately 70%) and nearly 30% patients come with swelling and pain. In group-A 53.3% patients had duration of illness less than 6 month followed by 26.7% had duration of illness 6-12 months and 20% patients had duration of illness was more than 1 year. Similarly, in

group-B 60% patients had duration of illness was less than 6 month followed by 30% had duration of illness was 6 - 12 months and 10% patients had duration of illness was more than 1 year. Most common type of hernia is right side hernia followed by left and only few patients had bilateral hernia.

Here, In group-A 43.3% had duration of hospitalization was 3 - 4 days followed by 36.7% had 1 - 2 days and 20% had greater than equal to 5 days. Similarly, in group-B 60% had duration of hospitalization 1 - 2 days followed by 30% had 3-4 days and 10% had greater than equal to 5 days. Smoking (26.6%), constipation (16.7%) and chronic cough (6.7%) were the main predisposing factor in group-A. And, in group-B smoking (23.3%), constipation (20%) and chronic cough (3.3%) were the main predisposing factor.

In group-A 13.3% patients had urinary retention followed by 10% had testicular oedema and 3.3% had wound infection. Similarly, in group-B 20% patients had urinary retention followed by 6.6% had testicular oedema post-operatively.

Table 1: Incidence of post-operative chronic groin pain.

Post operative day	Group A (n=30)	Group B (n=30)	P value
	N (%)	N (%)	
POD-1	28 (93.33)	21 (70)	> 0.05
POD-3	26 (86.67)	18 (60)	<001
POD-7	19 (63.33)	13 (43.33)	0.041
1 month	17 (56.67)	11 (36.67)	0.03
3 month	12 (40)	3 (10)	0.0001
6 month	9 (30)	3 (10)	0.034
1 Year	7 (23.33)	2 (6.67)	0.05

On day 1 of post-operation 28 patients (93.33%) had pain in group-A and 21 patients (70%) had pain in B, at 1 month of post-operation 17 patients (56.67%) had pain in group-A and 11 patients (36.67%) had pain in B, at 6 month of post-operation 9 patients (30%) had pain in group-A and 3 patients (10%) had pain in B and at 1 year of post-operation 7 patients (23.33%) had pain in group-A and 2 patients (6.67%) had pain in B. The difference in pain was significant after post-operative day 3rd (Table 1).

In group-A hypoesthesia was present in 19 patients (63.33%) on post-operative day 1, 9 patients (23.33%) at post-operative 1 month, 5 patients (16.67%) at post-operative 6 month and 3 patients (10%) at post-operative 1 year. Similarly, in group-B hypoesthesia was present in 19 patients (63.33%) on post-operative day 1, 10 patients (33.33%) at post-operative 1 month, 5 patients (16.67%) at post-operative 6 month and 5 patients (16.67%) at post-operative 1 year (Table 2).

Table 2: Incidence of post-operative hypoesthesia.

Hypo	Group-A (n=30)		Group-B (n=30)		P value
	No.	%	No.	%	
Day 1	19	63.33	19	63.33	1.0
Day 3	16	53.33	18	60	0.93
Day 7	12	40	15	50	0.71
1 month	9	30	10	33.33	0.8
3 month	7	23.33	6	20	0.8
6 month	5	16.67	5	16.67	1.0
1 year	3	10	5	16.67	0.75

In group-A numbness was present in 7 patients (23.33%) on post-operative day 1, 6 patients (20%) at post-operative 1 month, 5 patients (16.67%) at post-operative 6 month and 3 patients (11.11%) at post-operative 1 year. Similarly, in group-B numbness was present in 4 patients (13.33%) on post-operative day 1, 7 patients (23.33%) at post-operative 1 month, 5 patients (16.67%) at post-operative 6 month and 5 patients (16.67%) at post-operative year one (Table 3).

Table 3: Incidence of post-operative numbness

Numbness	Group-A (n=30)		Group-B (n=30)		P value
	No.	%	No.	%	
Day 1	7	23.33	4	13.33	0.54
Day 3	7	23.33	7	23.33	1.0
Day 7	6	20	7	23.33	0.8
1 month	6	20	7	23.33	0.8
3 month	6	20	6	20	1.0
6 month	5	16.67	5	16.67	1.0
1 year	3	11.11	5	16.67	0.8

DISCUSSION

Chronic groin pain is a significant and debilitating complication following open mesh hernia repair. Routine excision of ilioinguinal nerve in an attempt to decrease the incidence of chronic inguinodynia has been proposed by many studies, yet controversies persist.

So the present study was conducted to evaluate the effect of preservation verses elective division of the ilioinguinal nerve on post-operative chronic groin pain, hypoaesthesia and numbness after Lichtenstein tension free inguinal hernia repair in department of general surgery at PBM Hospital, Bikaner.

In the present study 60 patients were evaluated for pain, hypoesthesia and numbness, divided into two groups (group A-30 and group B-30). The patients were followed up at POD-1, 3, 7, 1, 3, 6 months and 1 year. In present study, On POD-1, 28 patients (93.3%) had pain in group-A and 21 patients (70%) had pain in B, at 1 month, 17 patients (56.6%) had pain in group-A and 11 patients

(36.6%) had pain in B, at 3 month, 12 patients (40%) had pain in group-A and 3 patients (10%) had pain in B, at 6 month of post-operation 9 patients (30%) had pain in group-A and 3 patients (10%) had pain in B and at 1 year, 7 patients (23.3%) had pain (mild) in group-A and 2 patients (6.67%) had pain (mild) in group B. The difference in pain was significant after post-operative day 3 ($p < 0.05$).

In Kumar et al study, the incidence of post-operative neuralgia in group A (nerve preservation) was compared with group B (nerve excision).¹² The result of the follow-up visits was 72% vs 82% ($p > 0.05$) at POD-1; 56% vs 14% ($p < 0.05$) at 1 month; 44% vs 12% ($p < 0.05$) at 2 months; and 28% vs 8% ($p < 0.05$) at 3 months in group A and group B respectively. Here the significant difference ($p < 0.05$) was found at 1 month, 2 months and 3 months. In study by Amuthan et al., the incidence of post-operative neuralgia in group A (nerve preservation) compared versus group B (nerve excision) showing was 24 Vs 19 ($p > 0.05$) at POD-1, 13Vs 10 ($p > 0.05$) at 1 month, 10 Vs 2 ($p > 0.05$) at 3 months and 8 Vs 1 ($p < 0.05$) at 6 months.¹³ There was no statistically significant difference of post-operative neuralgia ($p > 0.05$) at POD-1, at 1 month, and statistical significance ($p < 0.05$) at 3 months and at 6 months. Study by Picchio et al found that one week after operation, in groups A and B, respectively, pain assessed with the use of the 4-point verbal scale was absent in 150 patients (37%) and 141 patients (35%), mild in 180 (44%) and 183 (45%), moderate in 65 (16%) and 73 (18%), and severe in 13 (3%) and 8 (2%).¹⁰ One month after operation, follow-up visits were performed in 391 group A patients (96%) and 380 group B patients (94%). In particular, pain was absent in 195 (50%) of 391 patients in group A and 184 (48%) of 380 patients in group B. Of the 302 group A and 291 group B patients who made a follow up visit at 1 year postoperatively, pain was absent in 231 (76%) and 213 (73%) mild in 55 (18%) and 60 (21%), moderate in 11 (4%) and 9 (3%), and severe in 5 (2%) and in 9 (3%), respectively. In Ditttrick et al study, the incidence of postoperative neuralgia was significantly lower in the neurectomy group versus the nerve preservation group at 1 month: 5% vs 21% ($p = 0.016$); at 6 months: 3% vs 26% ($p < 0.001$); and at 1 year: 3% vs 25% ($p = 0.003$).¹¹ There was no significant difference in the incidence of postoperative neuralgia at 3 year: 6% vs 8% ($p = 0.748$). In Muneeb et al study, post-operative pain comparison at different post-operative weeks in both the groups was found statistically significant ($p < 0.05$).³ A significant decline in the pain scores were observed in group B from the first day of surgery till one month afterwards ($p < 0.01$).

In present study, Group-A hypoesthesia was present in 19 patients (63.3%) on post-operative day 1, 9 patients (30%) at post-operative 1 month, 7 patients (23.3%) at post-operative 3 month, 5 patients (16.6%) at post-operative 6 month and 3 patients (10%) at post-operative 1 year. Similarly, in group-B hypoesthesia was present in

19 patients (63.3%) on post-operative day 1, 10 patients (33.3%) at post-operative 1 month, 6 patients (20%) at post-operative 3 month, 5 patients (16.6%) at post-operative 6 month and 5 patients (16.6%) at post-operative 1 year. There was no statistically significant ($p > 0.05$) difference noted in both groups. In Picchio et al study, the incidence of post-operative hypoesthesia was 21% vs 49% at 1 month, 6% vs 29% at 6 months and 4% vs 11% at 1 year in group A and group B respectively.¹⁰ Here the difference was found to be significant ($p < 0.05$) in two groups. In Kumar et al study, the incidence of post-operative hypoesthesia was 12% vs 44% at POD-1, 10% vs 36% at 1 month, 8% vs 32% at 2 month and 8% vs 20% at 3 month in group A and group B respectively.¹² Here the p value was found to be insignificant ($p > 0.05$). In Amutha et al study, the incidence of hypoesthesia was 57.6% vs 62% at POD-1, 26.9% vs 37.5% at 1 month, 19.2% vs 20.8% at 3 month and 11.5% vs 16.6% at 6 month in group A and group B respectively ($p > 0.05$).⁶ There was no significant difference noted in both groups.

In present study, in group-A numbness was present in 7 patients (23.3%) on post-operative day 1, 6 patients (20%) at post-operative 1 month, 6 patients (20%) at post-operative 3 month, 5 patients (16.6%) at post-operative 6 month and 3 patients (11.1%) at post-operative 1 year. Similarly, in group-B numbness was present in 4 patients (13.3%) on post-operative day 1, 7 patients (23.3%) at post-operative 1 month, 6 patients (20%) at post-operative 3 month, 5 patients (16.6%) at post-operative 6 month and 5 patients (16.6%) at post-operative 1 year. Here, no statistically significant ($p > 0.05$) difference was found in both groups. In Picchio et al study, the incidence of post-operative numbness was 12% vs 14% at 1 month, 3% vs 5% at 6 months, and 6% vs 4% at 1 year in group A and group B respectively ($p > 0.05$).¹⁰ No difference was found between the 2 groups with respect to the presence of numbness. In Kumar et al study, the incidence of post-operative numbness was compared between group A and group B.¹² The results of follow up visits was 36% vs 6% at POD-1; 32% vs 10% at 1 month; 20 % vs 6% at 2 months and 24% vs 6% at 3 months. The difference was significant ($p < 0.05$). In Amutha et al study, the incidence of post-operative numbness was 19.2% vs 12.5% at POD-1, 23% vs 25% at 1 month, 15.3% vs 20.8% at 3 months and 11.5% vs 12.5% at 6 months in group A and group B respectively ($p > 0.05$).⁶ There was no significant difference noted in either group. In Amuthan et al. study, the incidence of post-operative numbness was compared between Groups A and B.¹³ The results of the follow-up visits are 19.2% versus 12.5% ($p > 0.05$) at POD-1, 23% versus 25% ($p > 0.05$) at 1 month, 15.3% versus 20.8% ($p > 0.05$) at 3 months, and 11.5% versus 12.5% ($p > 0.05$) at 6 months. The difference was insignificant ($p > 0.05$).

Post-operative groin pain is a significant problem after open inguinal hernia repair. Damage to ilioinguinal nerve passing through the surgical field is suspected to be one

of the main cause of chronic post-operative groin pain. A nerve may be damaged during operation as a result of perineural fibrosis, entrapment by sutures or prosthetic materials and direct lesions due to stretching, contusion, electrical injury and partial or complete division of the nerve. Elective division of the ilioinguinal nerve was proposed by hernia surgeons to reduce the risk of its inadvertent damage and consequent chronic pain.

The present study showed that pain after open hernia repair with polypropylene mesh is a relevant problem and is affected by elective division of the ilioinguinal nerve. Elective division of ilioinguinal nerve decreased the incidence of chronic post-hernioplasty groin pain. Moreover, the excision of the ilioinguinal nerve was not significantly related to sensory disturbances in the area of distribution of the nerve.

Although the study sample and follow up period is short in this study than reported by many previous studies, it is still wise to recommend ilioinguinal neurectomy in patients undergoing open mesh repair of inguinal hernia.

CONCLUSION

The study showed that chronic post-operative groin pain following the Lichtenstein tension-free hernioplasty was significantly less after excision of the ilioinguinal nerve. Furthermore, the procedure was not associated with additional morbidities in terms of post-operative hypoesthesia, numbness or other neurosensory disturbances or deterioration in quality of life.

This indicates that prophylactic neurectomy is a reasonable option in Lichtenstein inguinal hernia repair to decrease the incidence of post-operative chronic groin pain.

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