CHRONIC POSTOPERATIVE PAIN FOLLOWING GROIN HERNIA REPAIR: A COMPARISON BETWEEN NERVE PRESERVATION AND NERVE EXCISION

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ABSTRACT

Objective: The aim of the study was to compare the chronic postoperative pain following groin hernia repair with nerve preservation and nerve excision.

Material And Methods: The study was Randomized controlled trial conducted from January 2011 to january 2013 (of 2 year duration) at Surgical Department Hayatabad Medical Complex, Peshawar. Total number of 176 patients, aged between 18-70 years, having primary, unilateral inguinal hernia were enrolled from the Out Patients Department using convenience sampling. Patients were alternately divided into Group A (ilieo-inguinal nerve preservation) and Group B (ilieo-inguinal nerve excision). All patients underwent Lichtenstein tension free mesh hernioplasty. Chronic pain was assessed at 1 and 3 months of follow up.

Results: There were two surgical groups, Group A: (88 patients), Group B: (88 patients). At one month interval, Group A were having mild, moderate and severe pain in 32 (36.4%%), 18 (20.5) and 8 (8.1%) patients respectively while Group B patients were having mild 23 (26.1%), moderate 6 (6.8%) and severe 2 (2.3%) pain with a p-value of 0.001. Three months follow-up revealed mild, moderate and severe pain in 21 (23.9%), 6 (6.8%) and 3 (3.4%) patients respectively for Group A while Group B patients were having mild 8 (9.1%), moderate 0 (0%) and severe 1 (1.1%) pain with a highly significant P-value 0.001.

Conclusion: To reduce the incidence of chronic post-operative pain of hernia surgery, it is necessary to have a thorough knowledge of the groin anatomy to avoid injury or entrapment of the nerves by sutures or staples.

Key Words: Mesh repair, nerve excision, nerve preservation, visual analogue scale (VAS).

INTRODUCTION

Chronic groin pain is a significant problem following tension free hernioplasty with a reported incidence ranging from 19% to 62. 9%[1,2,3]. Although the pain is often mild in nature, studies on quality of life have shown that chronic pain irrespective of severity can significantly interfere with normal daily activities. Moreover, the condition can sometimes be debilitating and the treatment is often difficult and challenging[4,5].

The development of chronic pain following tension free hernioplasty has been attributed to several mechanisms including damage to ilioinguinal nerve passing through the surgical field proved by sensory disturbance and chronic pain, another proposed mechanism for development of chronic groin pain is fibrosis and inflammation induced by mesh with close proximity to ilioinguinal nerve in addition to unintentional injury or strangulation of the nerve by suturing[6,7].

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Multiple modalities have been used to treat the complication of groin pain, including injection of local anesthetics, pain medication, and additional surgery[8]. The ilioinguinal nerve is normally encountered during open inguinal hernia repair and may be inadvertently traumatized during dissection or interfered with during mesh placement. Traditional surgical techniques dictate that the ilioinguinal nerve should be preserved at all times during repair because of the presumed morbidity associated with cutaneous sensory loss and chronic groin pain following nerve injury[9].

Ilioinguinal neurectomy, however, is an effective treatment for relieving chronic groin pain following open hernia repair. Recent studies have demonstrated that excision of the ilioinguinal nerve during herniorrhaphy was associated with a decreased incidence of chronic groin pain after the operation[10,11,12]. Several published randomized controlled trials (RCTs) have compared preservation versus division of the ilioinguinal nerve during open repair of inguinal hernias[13,14].

These studies all indicated a decreased incidence of chronic groin pain after division of the ilioinguinal nerve, but the results must be regarded as inconclusive owing to the small sample sizes. Johner et al[15]. performed a meta-analysis of four studies that examined the effect of planned ilioinguinal nerve excision during inguinal hernia repair. These four articles examined whether

the excision method effectively prevented chronic groin pain after the surgery. However, the articles reviewed by Johneret al[15]. had evaluated groin pain and altered sensation only up to 6 months after surgery, whereas our study required follow- up for 3 months. Furthermore, the results of two new RCTs were published soon after Johner's review[16,17]. We thus investigated the patient outcomes of division versus preservation of the ilioinguinal nerve during open inguinal hernia repairs.

MATERIAL AND METHODS

It was a randomised controlled trail of 2 years duration from 1st Jan 2011 to 31st dec 2012, conducting in the surgical department of Hayatabad Medical Complex, Peshawar. Sample size was 88 patients in each group, using 94%% effectiveness of nerve excision and 79% effectiveness nerve preservation group in terms of chronic pain after inguinal hernia repaire[2], 95% confidence level and 90% power of test under WHO software for sample size determination was taken. They were allocated into Two groups by Consecutive sampling (non propability) technique.

All patients of either gender presenting with primary unilateral inguinal hernia in surgical OPD, aged 18-70 years were included.

Patients with obstructed/strangulated or recurrent hernia, Immuno compromised pts (DM, HIV/ AIDS etc) and obese pts were not included in study. The above mentioned conditions act as confounders and were excluded to reduce bias in the study results.

DATA COLLECTION PROCEDURE

The study was conducted after getting approval from hospital ethical and research committee. The patients meeting the inclusion criteria were included in the study through OPD/ER department. The diagnosis of Inguinal hernia was based upon patient having a visible bulge in inguinal region while he/she strains in standing position on naked eye examination. The purpose, risks and benefits of the study were explained to all included patients, they were assured that the study is purely conducted for research and data publication and a written informed consent was obtained from all included patients.

The patients were randomly divided in two groups by consective sampling method. Patients in group A were subjected to Ileoinguinal nerve preservation during hernia repair and patients in group B were subjected to nerve excision during repair for inguinal hernia.

Detailed history was taken from all patients followed by complete physical examination and routine pre-operative baseline investigations. All the patients were put on OT list for the next OT day and mesh repair was performed in all patients by a qualified general surgeon following criteria for pre-operative grouping.

Post operatively all patients were kept under observations for 24 hours in ward and were sent home once stable. Postoperatively all patients were followed at regular intervals and finally at the end of 3rd month to determine the severity of pain in the inguinal region on VAS to determine the effectiveness of the procedure.

All the above mentioned information including name, age, gender, address and telephone numbers were recorded on a pre-designed proforma. A strict exclusion criterion was followed to control confounders and bias in the study results.

STATISTICAL ANALYSIS

All the data was entered and analyzed in SPSS 10(version 10). Frequencies and percentages were calculated for categorical variables like Gender and effectiveness. Mean $\pm$ SD was calculated for numerical variables like age. Chi-Square test was used to compare the effectiveness in both the groups. P value of $\leq$ 0.05 was considered significant. Effectiveness in both groups was stratified among the age and gender to see the effect modifiers. All the results were presented as tables and charts.

RESULTS

The study was carried out on 176 patients in Hayatabad Medical Complex divided into two surgical groupsfirst group: nerve preservation (88 patients), second group: nerve excision (88 patients).

Sex wise distribution showed that out of 88 patients 84(95.4%) were male and 4(4.5%) were female while excision Lichtenstein repair group contains 81(92%) were male and 7(8%) were female. Sex

Table 1: Gender Wise Distribution (N=176)

	Groups		Total	p-value
	Nerve Preservation	Nerve Excision		
Gender Male Count % within Groups	84 95.4%	81 92.0%	165 93.75%	0.5355
Female Count % within Groups	4 4.5%	7 8.%	11 6.25%	
Total Count % within Groups	88 100.0%	88 100.0%	176 100.0%	

Table 2: Age Wise Distribution (n=176)

	Groups		Total	p-value
	Nerve Preservation	Nerve Excision		
age (in years) 18-30 Count % within Groups	17 19.3%	13 14.8%	30 17.0%	0.686
31.00 - 45.00 Count % within Groups	11 12.5%	16 18.2%	27 15.3%	
46.00 - 60.00 Count % within Groups	43 48.9%	43 48.9%	86 48.9%	
60.00+ Count % within Groups	17 19.3%	16 18.2%	33 18.8%	
Total Count % within Groups	88 100.0%	88 100.0%	176 100.0%	

Table No: 3.Comparison of Pain in Both the Groups at 1 Month (n=176)

At One month interval	Groups		Total	p-value
	Nerve Preservation	Nerve Excision		
Pain No Pain Count % within Groups	31 35.2%	56 63.6%	87 49.4%	0.001
Mild Count % within Groups	32 36.4%	23 26.1%	56 31.8%	
Moderate Count % within Groups	18 20.5%	6 6.8%	13 7.4%	
Sever Count % within Groups	7 8.0%	3 3.4%	20 11.4%	
Total Count % within Groups	88 100.0%	88 100.0%	176 100.0%	

Table no: 4. Comparison of Pain in Both the Groups at 3 Months (n=176)

	Groups		Total	p-value
	Nerve Preservation	Nerve Excision		
Pain No Pain	58 65.9%	79 89.8%	137 77.8%	0.001
Mild	21 23.9%	8 9.1%	29 16.5%	
Moderate	6 6.8%	0 .0%	6 3.4%	
Sever	3 3.4%	1 1.1%	4 2.3%	
Total	88 100.0%	88 100.0%	176 100.0%	

distribution among the groups was insignificant with p-value=0.5355. (Table 1)

Average age was 47.95 years $\pm$ 14.176SD. Group A contained 17(19.3%) patients in 18-30 years age, 11(12.5%) patients of 31-45 years, 43(48.9%) patients of 45-60 years and 17(19.3%) patients of more than 60 years age. While group B contained 13(14.8%) patients in 18-30 years age group, 16(18.2%) in 31-45 years age group, 43(48.9%) patients of 45-60 years age and 16(158.2%) patients were more than 60 years old. The age distribution among the group was also insignificant with p-value 0.686. (Table 2)

There were two groups, Group A: (88 patients), and Group B: (88 patients). At one month interval, Group A were having mild, moderate and severe pain in 32 (36.4%%), 18 (20.5) and 8 (8.1%) patients respectively while Group B patients were having mild 23 (26.1%), moderate 6 (6.8%) and severe 2 (2.3%) pain with a p-value of 0.001 (Table 3). Three months follow-up revealed mild, moderate and severe pain in 21 (23.9%), 6 (6.8%) and 3 (3.4%) patients respectively for Group A while Group B patients were having mild 8 (9.1%), moderate 0 (0%) and severe 1 (1.1%) pain with a highly significant P-value 0.001. (Table 4).

DISCUSSION

Postoperative groin pain is a serious problem after open inguinal hernia repair. The mechanism responsible for the development of this postoperative pain is thought to be the entrapment, inflammation, and fibrotic reactions of the nerve around the mesh[16]. Excision of nerves is an effective surgical procedure to prevent chronic groin pain after open hernia repairs[16,17].

The report from the Amid et al. study, suggests that the incidence of chronic pain, regardless of grade, 12 months after surgery, is approximately 29%, with 11% of patients complaining of severe, invaliding pain[16]. In a study about relation between nerve management and CP after open groin hernia repair, the CP rates after 6 months and 5 years were 16.5% and 16.1%, respectively[18].

In Caliskan Nursal et al[19] study, one month after operation, the incidence rate of postoperative chronic pain (PCP) was significantly lower in Lichtenstein and neurectomy group versus only Lichtenstein group. At 6 months, there was no significant difference between both groups regarding PCP at rest and coughing. The sensorial changes in the groin region were similar in the two groups. In the first month, patients who underwent neurectomy had more inguinal sensory changes than the control group; however, there were no statistically significant differences between two groups 6 months after the operations.

In Sergio Alfieri et al study, most of patients with chronic pain slowly recovered at 1 year only with conservative or medical treatment. This suggests that no surgical treatment should be considered for at least 1 year for these patients[6]. In a previous prospective study, effectiveness of iliohypogastric neurectomy in preventing postoperative pain was reported; In the consecutive series of 180 anterior tension-free repairs, no patient complained of severe postoperative pain. Two years after surgery, 15 patients complained of hypoesthesia, although no one ever considered it debilitating[7]. In a study the incidence of chronic groin pain at 6 months was significantly lower in ilioinguinal neurectomy group than ilioinguinal nerve preservation group. No significant intergroup differences were found regarding the incidence of groin numbness, postoperative sensory loss or changes at the groin region at 6 months after the operation[8].

In Malekpour et al study, post operative pain was lesser in nerve-excisied group in the first month after surgery. But 6 months and 1 year post surgery, no significant differences were found[1]. Another retrospective study reported that incidence of chronic groin pain in patients who had elective neurectomy was significantly lower in comparison with control group. Furthermore, it demonstrated that elective excision of the ilioinguinal nerve was not associated with additional morbidities in neurosensory disturbances, groin numbness or quality of life at 6-month follow-up [1].

Based on our study, in evaluation of post-surgical complications (e.g chronic pain, wound infection and paraesthesia), no significant differences between two groups were found except in post-operative chronic pain. This shows that, there is no increase in post-operative chronic pain after prophylactic excision of the ilioinguinal nerve. Return to work was earlier in the nerve-excised group. Overall, our study showed that ilioinguinal-excision during Lichtenstein technique significantly decreased post-operative pain in short-term follow-up; this demonstrates the superiority of nerve excision surgery. Also it decreases the time to return to work. However, numbness is an inevitable complication, but it seems that pain-relief is the more important factor than numbness to satisfy patients. Elective division of the ilioinguinal nerve during inguinal hernia repair does not appear to be associated with a significant increase in postoperative symptoms[15].

Evaluation of pain was subjective in our study and this is one of the limitations. Another limitation was that the long-term effect of ilioinguinal neurectomy was not investigated. Larger clinical trials with more patients and longer follow-up are warranted to study the long-term effect of prophylactic neurectomy in patients undergoing Lichtenstein repair. And finally we showed that prophylactic neurectomy reduces the incidence of post-operative chronic pain.

Ilioinguinal nerve excision at the time of inguinal hernia repair decreased post-surgical inguinal pain and it can be used as a routine method in herniorrhaphy. This procedure is safe and easy to perform during open hernia mesh repairs. However, further studies are needed to demonstrate the effectiveness of this procedure in various settings; but our study recommends that Ilioinguinal neurectomy should be considered as a routine surgical step during open mesh hernia repair.

CONCLUSION

A planned resection of the ileoinguinal nerve at the time of inguinal hernia repair is associated with a decrease in the incidence of chronic postoperative pain. Thus, carrying out this simple maneuver at the time of surgery might decrease a major source of postoperative patient morbidity.

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