

## To evaluate the effect of elective ilio-inguinal neurectomy during open inguinal hernia repair

Sukhwinder Singh<sup>1</sup>, Neelam Banga<sup>2</sup>, Alok Goyal<sup>3</sup>, Nikhil<sup>4</sup>

<sup>1</sup>Senior Resident, Department of Urology, Govt. Medical College & Hospital, Patiala.

<sup>2</sup>Assistant Professor, Department of Physiology, Govt. Medical College & Hospital, Patiala.

<sup>3</sup>Senior Resident, Department of Surgery, Govt. Medical College & Hospital, Patiala.

<sup>4</sup>Junior resident, Department of Surgery, Govt. Medical College & Hospital, Patiala

### Corresponding author

Dr. NeelamBanga

Assistant Professor, Department of physiology, Govt. Medical College & Hospital, Patiala.

### ABSTRACT

**AIMS & OBJECTIVES:** To evaluate the effect of elective ilioinguinalneurectomy during open inguinal hernia repair.

**MATERIALS & METHODS:** 60 patients of inguinal hernia were selected. Elective ilioinguinalneurectomy was performed on 30 patients-study group (Group A), while nerve was preserved in 30 patients – control group (Group B). These patients were followed up at 2 weeks, 1 month and 3 months after discharge postoperatively. Patients in both groups were also evaluated for any pain and for the presence of any numbness in the region.

**RESULTS:**Ilioinguinalneurectomy is associated with a significantly lower incidence of post-operative neuralgia with pain severity is much less as compared to routine nerve preservation.

**CONCLUSION:**There is trend towards increased incidence of subjective numbness in patients undergoing elective neurectomy upto 2 weeks postoperative, but there is no significant increase afterwards.

**KEYWORDS:** Inguinal hernia, neurectomy, postoperative neuralgia, hernioplasty.

### INTRODUCTION

Repair of inguinal hernias is one of the most commonly performed surgical procedures in the world. Open surgery of inguinal hernia (Lichtenstein operation or “Plug and Patch” technique) with implantation of a synthetic mesh is a favored method for the repair of a groin hernia, mainly due to its satisfying results and patient’s comfort [1].

Many complications may occur after surgery as infection, recurrence and chronic post -operative pain. Nerve entrapment is one of the most common causes of chronic pain after inguinal hernia repair. The Ilioinguinal nerve is the most frequently entrapped nerve because it lies immediately beneath the divided external oblique fascia, and the mechanism seems to be injury by suture, adherence to overlying implanted mesh, or involvement in scar tissue [2].

Traditional surgical teaching dictates that the nerve should be preserved at all times during repair because of the supposed morbidity associated with cutaneous sensory loss and chronic pain following nerve injury. However, some studies suggested that elective neurectomy of one or more nerves significantly decreases the incidence of chronic groin pain after hernia repair compared to routine nerve preservation.

In addition ilioinguinalneurectomy is a well documented effective treatment of relieving chronic groin pain following open hernia repair achieving more favorable outcomes than nerve block or mesh removal alone [3]. Still others concluded that preservation or division of ilioinguinal nerve do not affect occurrence of postoperative pain [4]. Controversy exists on if this nerve should be preserved or sacrificed.

The aim of this current study is to evaluate the effect of ilioinguinalneurectomy on the incidence and severity of chronic groin pain following Lichtenstein tension free hernioplasty operation for inguinal hernia.

### AIMS AND OBJECTIVES

- 1) To evaluate the effect of ilioinguinalneurectomy on the incidence of chronic groin pain, and if present grade the severity of chronic groin pain.
- 2) To check for any numbness in the region supplied by the nerve following ilioinguinalneurectomy.

### MATERIALS AND METHODS

The study was conducted in Surgery Department, Government Medical College & Rajindra Hospital, Patiala. The study consisted of 60 patients which were divided randomly into two groups (Group A & B) of 30 patients each. Elective ilioinguinalneurectomy was performed in Group A while nerve was identified and preserved in Group B. Sixty male patients of inguinal hernia admitted fulfilling inclusion criteria were included in the study. Ethical approval was obtained.

**Inclusion criteria:** Age above eighteen years, male patients with unilateral inguinal hernia either direct or indirect.

**Exclusion criteria:** Those with recurrent hernia, complicated hernia with inflammation and/or strangulation, history of previous surgery of inguinal region were excluded from the study.

Preoperative assessment of the severity of inguinal pain by 4 point verbal rank scale (none, mild, moderate and severe) after various activities (at rest, coughing for 10 times, walking up 3 steps of stairs) were taken and those having any degree of chronic groin pain were excluded from the study.

All patients were subjected to preoperative assessment via

1. Complete medical history stressing on duration of hernia.
2. Physical examination focusing on the type of hernia (direct or indirect), bilateralism and presence of any complications.
3. Routine preoperative investigations (Haemoglobin, Bleeding Time, Clotting Time, Total Leukocyte Count, Differential Leukocyte Count, Fasting Blood Sugar, and Renal Function Tests).
4. Pre-anaesthetic check-up.

All repairs were performed using an open tension-free mesh technique as described by Lichtenstein et al. Surgery was performed with the patient under spinal anaesthesia or general anaesthesia, if indicated. The nerve was identified and dissected then cut sharply with a scissor just lateral to the internal inguinal ring, and 4 to 5 cm of the nerve was excised in study group (Group-A). The cut ends were tied with silk suture no. 3-0. The nerve was identified and

preserved in control group (Group-B). These patients were followed at 2 weeks, 1 month and 3 months after discharge postoperatively and were evaluated for any pain at rest by 4 point verbal rank scale (none, mild, moderate and severe).

### Grading of pain:

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

Moderate pain is defined as pain that interferes with return to normal everyday activities, with analgesics rarely being needed.

Severe pain is defined as pain that incapacitated the patient, at frequent intervals, or interferes with everyday activities with frequent need of pain-killers [5].

Patients were asked to express agreement or disagreement on a 4-point verbal-rank scale.

All the patients were also asked for presence of any numbness in the region. Incidence of postoperative pain and numbness was monitored and the results were statistically analysed.

### OBSERVATIONS

Duration of pain		Grade of pain				P value
		0	1	2	3	
2weeks post op	N*	70%	23.33%	6.67%	-	0.493
	C**	53.33%	33.33%	10%	3.33%	NS***
1month post op	N*	76.67%	20%	3.33%	-	0.235
	C**	56.67%	33.33%	10%	-	NS***
3months post op	N*	100%	-	-	-	0.024
	C**	80%	10%	10%	-	S*****

N\*-Neurectomy group

C\*\*- Control group

NS\*\*\*- Non significant

S\*- Significant

The incidence of pain at 2 weeks and 1 month post-operative the results were statistically non-significant for all events. At 3 month post-operative, the results were statistically significant.

### Incidence of numbness

	Neurectomy (group A)	Control (group B)	P value
At 2 weeks	30.00%	3.33%	0.006*
At 1 month	16.67%	3.33%	0.085
At 3 <sup>rd</sup> month	6.67%	3.33%	0.554

\*Significant

In the study, it was observed that the incidence of numbness was statistically significant till 2 weeks post-operative. Thereafter, the results were statistically non-significant.

### DISCUSSION

Chronic pain following inguinal hernia repair is becoming a significant clinical problem, involving an increasing number of patients and surgeons, as shown by the rising number of

publications over the last 10 years dealing with post-operative pain syndrome. Often patients come to our attention complaining of groin pain, after a hernia operation performed elsewhere, both for a second opinion regarding treatment and for possible legal procedures [4].

First of all, it is important to differentiate chronic pain from acute pain. Early postoperative pain is usually seen soon after surgery; it is easily and successfully managed with analgesics and generally resolves within 15 to 30 days of surgery without the need of further treatment. On the contrary, moderate to severe chronic pain, generally seen 3 months after surgery, may result in a potentially debilitating condition, becoming not only a therapeutic challenge but sometimes resulting in the patient being unable to perform daily activities or to return to work. It may be refractory to analgesics and successfully treated only by further surgery, such as neurectomy, neurolysis, or excision of the neuroma. This complication is more frequent than would appear from reports in the literature, with the incidence increasing in recent years [4].

Neuropathic pain is usually caused by actual involvement of any of these three nerves: ilioinguinal nerve, iliohypogastric nerve and the genital branches of the genitofemoral nerve, of which the ilioinguinal nerve is involved most commonly. The main causes of injury are inadequate dissection, failure to visualize and protect the nerve during the hernia repair and failure to recognize the aberrant location and anatomic variations of the nerve.

The ilioinguinal nerve is also the most commonly involved nerve in perineural fibrosis. It has the highest risk for entrapment because it lies immediately beneath the divided external oblique fascia and can be included in sutures used for hernia repair or to re-approximate the external oblique fascia. Mesh placed atop the internal oblique fascia/muscle can adhere to the ilioinguinal and/or iliohypogastric nerves during healing.

This study was conducted to evaluate the effect of preservation or elective division of the ilioinguinal nerve on chronic inguinal pain and other postoperative symptoms like numbness after open inguinal hernia repair with mesh.

#### ON 2<sup>nd</sup> POST OPERATIVE WEEK:

30% patients in the neurectomy group had some degree of pain while 46.66% in the control group had experienced pain at 2 weeks post-operative. These observations are in accordance with the observations made by Hokkam [1].

The incidence of numbness was higher in the neurectomy group than in the control group (30.0% vs. 3.33%, p value- 0.006, Significant) which are in accordance with those made by Hokkam<sup>1</sup> and Crea et al [6]. Hokkam had observed that the incidence of numbness in neurectomy group was 30.8% as compared to 3.3% among nerve preservation group. In the study conducted by Crea et al, 53.3% patients in neurectomy group and 9.6% patients in control group had numbness on 1<sup>st</sup> POD.

#### After 1 Month Follow Up :

The incidence of pain at rest in the neurectomy group compared to the control group is in accordance with the results shown by the studies conducted by Picchio et al<sup>7</sup> and others [3, 4, 8] which suggest that there is non-significant difference between the two groups as far as the incidence of pain at 1 month post-operative is concerned.

At one month follow-up, among the earlier studies, 50% patients in the neurectomy group and 52% patients in the control group had post-operative pain (Picchio et al) [7] while 80% patients compared to 60% patients had pain in the study by Bansal et al, whereas the incidence was 10% vs. 20% and 17% vs. 17% in the studies conducted by Ibrahim et al[4] and Mui et

al[3]respectively. Although there was much difference among the data available from different studies but the main inference was that there is non-significant difference in the incidence of post-operative pain at rest among both the groups at one month post-operative.

Although the incidence of numbness decreased among both the groups with time, yet the numbness at 1 month post-operative was higher in the neurectomy group than in the control group (16.67% vs. 3.33%, p value- 0.085, Non-significant). The study conducted by Crea et al [6] and Bansal et al[8] also showed that the incidence of numbness was more among the neurectomy group, 11.1% vs. 3.8% and 48.0% vs. 36.0% respectively while others had shown findings as (Ibrahim et al 10.0% vs. 15.0% and Picchio et al 12.0% vs. 14.0%). Thus, the results shown by present study are in accordance with these studies that there is statistically insignificant difference in the incidence of numbness at 1 month post-operative.

After 3 Month Follow Up Although there is not much data available about the incidence of post-operative pain after 3 months yet the inference of present study is in accordance with findings of most authors. A study conducted by Hokkam observed that the incidence of pain at rest was 15.4% vs 30.8% among the study group and control group respectively. Another study by Narita et al<sup>9</sup> showed the incidence as 15.0% among neurectomy patients while it was 31.6% among the control group whereas results shown as per a recent study by Bansal et al[8] were similar among both the groups (8.0% vs 8.0%).

The number of patients who complained of numbness was higher in the nerve excision group than the control group and it is thought that nerve division may lead to higher proportions of patients with sensory disturbances, but the findings in both groups gradually improved with time. The incidence of numbness at 3 month post-operative was 6.67% vs. 3.33% p-value 0.554, Non-significant. This is thought that progressive compensation from adjacent sensory nerves seems to improve these neurosensory disturbances.

According to Hokkam, the incidence of numbness was found to be 15.4% vs 3.8% whereas Bansal et al showed the incidence as 4.0% vs 8.0%. On the contrary, Ravichandran et al [10] and others [9, 11] had inferred that there is no difference in the incidence of numbness in the neurectomy group and the nerve preservation group at any point of time.

## SUMMARY & CONCLUSION

It was concluded that ilioinguinalneurectomy is associated with a significantly lower incidence of post-operative neuralgia compared to routine nerve preservation, which is a common complication following inguinal hernia repair.

Pain severity reported with ilioinguinalneurectomy is much less than that reported in control group. There is trend towards increased incidence of subjective numbness in patients undergoing elective neurectomy upto 2 weeks post-operative but there is no significant increase afterwards.

## ACKNOWLEDGMENT

Nil

## AUTHORS' CONTRIBUTIONS

The authors have made considerable contributions to the work reported in the manuscript.

## CONFLICTS OF INTEREST

The authors confirm that this article content has no conflicts of interest.

**AUTHORS FUNDING**

Not applicable.

**BIBLIOGRAPHY**

1. Hokkam E. The effect of ilioinguinalneurectomy in elective inguinal hernia repair on chronic postoperative pain. *Egyptian Journal of Surgery*. 2009; 28(4): 68- 72.
2. Madura JA, Madura JA II, Copper CM, Worth RM. Inguinal neurectomy for inguinal nerve entrapment: an experience with 100 patients. *Am J Surg*.2005;189:283-7.
3. Mui WL, Ng CS, Fung TM, Cheung FK, Wong CM, Ma TH, et al. Prophylacticilioinguinalneurectomy in open inguinal hernia repair: a double-blind randomizedcontrolled trial. *Ann Surg*. 2006; 244:27-33.
4. Ibrahim MG, Fayed WI, Soliman KE, Hamza AM. A randomized controlled studyto compare the effect of ilioinguinalneurectomy or preservation of the ilioinguinalnerve in Lichtenstein tension free hernioplasty for inguinal hernia. *Journal of theMedical Research Institute JMRI* 2006; Vol. 27 No.4: (283 -8).
5. Pappalardo G, Frattaroli FM, Mongardini M, Salvi PF, Lombardi A, Conte AM, et al. Neurectomy to prevent persistent pain after inguinal herniorraphy: a prospective study using objective criteria to assess pain.. *World J Surg*. 2007;31(5):1081-6.
6. Crea N, Pata G. Effects of prophylactic ilioinguinal nerve excision in mesh groin hernia repair: short- and long-term follow-up of a randomized clinical trial. *Am Surg*. 2010 Nov;76(11):1275-81.
7. Picchio M, Palimento D, Attanasio U, Matazzo PF et al.: Randomised controlled trial of preservation or elective division of ilioinguinal nerve in open inguinal hernia repair with polypropylene mesh. *Arch Surg*; 2004; 139: 755-758.
8. Bansal A, RabhaS,Griwan M, Karthikeyan Y. Comparative Evaluation Of Preservation Versus Elective Division Of The Ilioinguinal Nerve In Open Mesh Repair Of Inguinal Hernias. *The Internet Journal of Surgery*. 2013;30(1): 46- 50.
9. Narita M, Okamoto S, Koshiba T, Yamagami K, Sakano S, Yamamoto M. IlioinguinalNeurectomy in Adult Open Inguinal Hernia Repair to Prevent Postoperative Chronic Pain. 2008;Vol.41(10): 1765-1774.
10. Ravindran R, , Bruce J, Debnath D Poobalan A, King PM. A United Kingdom survey of surgical technique and handling practice of inguinal canal structures during hernia surgery.*Surgery* 2006;139:523-6.
11. Hsu W, Chen CS, Lee HC, Liang HH, Kuo LJ, Wei PL, Tam KW.Preservation versus division of ilioinguinal nerve on open mesh repair of inguinal hernia: a meta-analysis of randomized controlled trials. *World J Surg*. 2012 Oct;36(10):2311-9.