

ORIGINAL RESEARCH ARTICLE

Comparative Study of Preservation versus Division of Ilioinguinal, Iliohypogastric and Genital Nerves During Lichtenstein Hernioplasty.

Deepak G. Udupudi¹, Reethesh R. Shetty² & Arun Prasad D².

¹Professor & ²Junior Resident, Department of General Surgery, JJM Medical College, Davangere, Karnataka, India.

Abstract:

Aim: Identification & preservation of all three inguinal nerves (Ilioinguinal nerve (IIN), Iliohypogastric nerve (IHN), Genital branch of Genitofemoral nerve (GFN)) during Lichtenstein hernia repair compared to neurectomy of all nerves in terms of complications like chronic groin pain and altered sensation.

Methods: Sixty patients with primary unilateral inguinal hernia undergoing Lichtenstein's hernioplasty under SA from August 2012 to September 2014 were divided in two groups of 30 each, with an attempt made to identify all three inguinal nerves in both the groups, and nerves preserved in one (Group A) and deliberate neurectomy done in another group (Group B). Neurectomy specimen was confirmed by HPE. Pain (at rest, during normal daily activities, on walking stairs, on prolonged standing) and complaints of altered sensation at 1, 3 and 6 months after surgery was evaluated in both groups using a visual analog scale. Results were compared using chi-square test and Fischer exact test.

Results: A total of 60 patients were eligible for the study during 2 years, with study group consisting from age 20 to 50 years, highest number of patients were in the age group 40-49 years (56.66 % v/s 53.33%) and right sided indirect hernias being more common in both the groups. Ilioinguinal nerve was identified in 58 cases (96.6%), Iliohypogastric all 60 cases (100%) and Genital branch of Genitofemoral nerve in 22 cases (36.6%) with 100% histological confirmation in resection group. No statistically significant difference was found among groups for complaints of pain during normal daily activities, on walking stairs and on prolonged standing. When incidence of altered sensation was compared, a high incidence was noted at first month (46.67% v/s 33.33%), with gradual decrease in incidence over follow up period, at 3 month (33.33 % v/s 20%) and at 6 months (20% v/s 13.30%) but the difference was not statistically significant.

Conclusion: A planned resection of the inguinal nerves at the time of hernioplasty is associated with a decrease in the incidence of chronic post-operative groin pain without any significant neurosensory disturbances. Hence neurectomy can be considered as a routine surgical step during Lichtenstein hernia repair.

Key words: Inguinal hernia, Lichtenstein's repair, Chronic inguinaldynia, Neurectomy, Ilioinguinal nerve.

Introduction:

Iliohypogastric nerve, Genital branch of Genito femoral nerve. Groin hernia repair is one of the most common operations performed by general surgeons, with at least 5% of the population developing a groin hernia in their lifetime [1]. As the recurrence rate is reduced to less than 5% after mesh repair, nowadays long term

morbidity associated with open inguinal hernia repair is mainly related to chronic groin pain [2]. Most recent prospective and population based studies have indicated, up to 6% of patients may have moderate to severe pain one year after surgery.

Address for correspondence:

Dr. Deepak G. Udupudi,
Professor,
Department of General Surgery,
JJM Medical College,
Davangere, Karnataka, India.
Email:udapudideepak66@gmail.com

How to cite this article:

Deepak G Udupudi, Reethesh R Shetty & Arun Prasad D. : Comparative Study of Preservation versus Division of Ilioinguinal, Iliohypogastric and Genital Nerves During Lichtenstein Hernioplasty.: International Journal of current Medical and Applied sciences; 2016, 13(1),01-05.

Access this Article Online



Quick Response Code

Website:

www.ijcmaas.com

Subject:

Medical Sciences

In all, over a third will report some form of pain at one year after operation, but only 2-4% are adversely affected by chronic pain in daily life [3].

The international association for the study of pain (IASP) describes chronic groin pain as “groin pain reported by the patient at or beyond 3 months following inguinal hernia repair” [4]. Both patient (preoperative pain with functional impairment) and operative factors predict the likelihood of persistent post hernia repair pain [5]. Intra operative nerve injury has been shown to correlate independently with post-operative pain related impairment [5]. Damage to, or entrapment of, one or more of the three nerves passing through the operative field might cause neuropathic pain. The pattern of nerve injury described includes inadvertent suture entrapment, partial division, crushing, and diathermy burn or scar encroachment.

This study was undertaken to assess the feasibility of identification & preservation of all three inguinal nerves-Ilioinguinal nerve (IIN), Iliohypogastric nerve (IHN), Genital branch of Genito femoral nerve (GFN) during Lichtenstein hernia repair compared to neurectomy of all nerves in terms of post-operative chronic groin pain and altered sensation.

Material and Methods:

This comparative study was conducted from the patients admitted with unilateral primary uncomplicated indirect and direct inguinal herniae in Bapuji hospital and Chigateri hospital attached to JJM medical college Davangere from August 2012 to September 2014. The diagnosis of unilateral primary inguinal hernia was made essentially on clinical examination and with appropriate investigations; patients were assessed for fitness for surgery.

The study included 60 male patients of age 20-50 years with unilateral primary inguinal hernia divided into two groups (group A and B) of 30 each. Exclusion criteria were: patients aged less than 20 years and more than 50 years, Female patients, recurrent hernia, complicated hernia, and patients undergoing other surgical

Results:

Table 1: Comparison of Age wise distribution of cases

Age group (years)	Nerve Preservation group n=30(%)	Nerve Resection group n=30(%)	Statistical Analysis χ^2 test
20 - 29 Years	03 (10)	05 (16.6)	0.59, Not significant
30 - 39 Years	10 (33.33)	09 (30)	
40 - 49 Years	17 (56.66)	16 (53.33)	

A total of 60 patients were eligible for the study during 2 years with study group consisting from age 20 to 50 years, highest number of patients were in the age group 40 - 49 years. (56.66% v/s 53.33%) and right sided indirect herniae being more common in both the groups (Table 1).

Table 2: Evaluation of the feasibility of nerve recognition:

	Preservation Group(n = 30)	Resection Group (n=30)	HPR confirmation	Total (n = 60)
Nerves identified	identified	identified	HPR confirmation	
IIN	29(96.6)	29(96.6)	58(96.6)	58(96.66)
IHN	30(100)	30(100)	30(100)	60(100)
GFN	12(40)	10(33)	10(100)	22(36.6)

procedures concurrently. After necessary approval from the local bioethics committee, informed consent was obtained before surgery, describing the benefits or problems associated with planned intervention.

Under spinal anaesthesia the inguinal hernia was repaired using open tension free mesh repair as described by Lichtenstein et al.[6] similar surgical methodology was followed in both the groups .Nerve preservation was done in group of 30 patients of group A and resection in another 30 patients of Group B, neurectomy specimen was confirmed by histopathological analysis. Nerve division was done using surgical blade and neither cautery nor suture ligations were used. Prolene mesh of size 6x11cms manufactured by Ethicon was used in the Lichtenstein mesh repair. Polypropylene 2-0 was used to suture the mesh in place. Sutures were removed on post-operative day 7 and patients were discharged if there was no wound related complications. Subsequently patients were called to outpatient department for follow up at 1, 3 and 6 months post-surgery.

Follow up Assessment:

Assessment of pain: Assessment for pain was done using Visual analogue scale (VAS). VAS consists of 10 cm line anchored at one end by a label as no pain and at the other end by a label such as severest pain patient experienced in his life time. We translated this for documentation as no pain (score of 0), mild pain (1-3), moderate pain (4-7), and severe pain (8-10).

Components of pain assessed were pain at rest, during normal daily activities, on walking stairs and pain on prolonged standing at 1, 3 and 6 months each.

Assessment of altered sensation: Patients were also assessed for altered sensation in groin region using similar methodology, with no altered sensation (score of 0), mild complaint (1-3), moderate (4-7), severe complaints of altered sensation (score of 8-10) at 1, 3 and 6 months each.

Statistical analysis of data was done using chi square test.

Ilioinguinal nerve was identified in 58 cases (96.6%), Iliohypogastric in all 60 cases (100%). Genital branch of genito femoral nerve in 22 cases with 100% confirmation (Table 2).

Table 3: Comparison of incidence of pain:

	1 month (n=30)	3 month (n=30)	6 month (n=30)
Nerve preservation	14(46)	15(50)	10(33.33)
Nerve resection	21(70)	10(33.33)	2(6.6)

Overall Chronic pain among patients of group A at 1 month, 3 month, and 6 months follow up was seen in 14 (46%), 15 (50%) and 10 (33.33%) of the patients compared to 21 (70%) ,10 (33.33%)and 2 (6%) patients of group B implying a significant reduction in incidence of pain with time in nerve resection group (Table 3).

Table 4: Analysis of comparison of pain at rest:

Pain at rest	Nerve Preservation group n=30	Nerve resection group n=30	Statistical Analysis χ^2 test
1 Month	5(16.7)	9(30.0)	4.29, p<0.03
3 Months	5(16.7)	6(20.0)	
6 Months	4(13.3)	0	

Chronic pain at rest at 1 month, 3 month, and 6 months follow up was seen in (16.66% v/s 30%) ,(16.66% v/s20%) and 13.3% v/s none) of the patients respectively with statistically significant difference of pain($p<0.003$) observed at 6th month of follow up (Table 4).

Table 5: Overall pain assessment from one to six months

groups	N	Mean pain score	SD	Unpaired t test
Preservation	30	2.94	2.79	1.98, p<0.05
Resection	30	1.77	1.81	

Overall pain assessment scores for groups when compared, showed a statistically significant difference with a mean pain score over 6 months follow up of 2.94+- 2.79 v/s 1.77+-1.81 ($p< 0.05$) favouring a reduced pain in nerve resection group (Table 5).

Table 6: Analysis of comparison of altered sensation

Altered Sensation	Preservation Group n=30(%)	Resection Group n=30(%)	Statistical Analysis χ^2 test
1 Month	14 (46.7)	10(33.3)	1.11, NS
3 Months	10(33.3)	6(20.0)	1.36, NS
6 Months	8(26.7)	4(13.3)	1.68, NS

At no point of assessment for complaints of pain during normal daily activities, pain on walking stairs and for pain on prolonged standing any statistically significant difference was found among groups.

On comparing incidence of altered sensation, a high incidence was noted at first month (46.67% v/s 33.33%), with gradual decrease in incidence over follow up period, at 3 month (33.33% v/s 20%) and at 6 months(20% v/s 13.30%) but the difference was statistically insignificant. (Table 6).

Discussion:

All inguinal herniae share the common feature of emerging through the myopectineal orifice of Fruchaud, the opening in the lower abdominal wall bounded above by the myoaponeurotic arch of the lower edges of the Internal Oblique and the Transverses Abdominus muscle, and below by the pectineal line of the superior pubic ramus.

Inguinal hernia surgeries are one of the most frequently performed operations in general surgery.

Lichtenstein tension-free pre shaped mesh hernioplasty has become a gold standard for hernia repair. The use of open mesh repair is associated with a reduction in recurrence rate of between 50%- 75% compared with open repair without mesh. As the recurrence rate is reduced to less than 5% after mesh repair, nowadays long term morbidity associated with open inguinal hernia repair is mainly related to chronic pain.

Chronic post hernioplasty groin pain, defined as pain lasting for more than 3 months after surgery is one of the most important complications occurring after inguinal hernia repair, occurs with a frequency more than previously thought. The most common types of chronic post-operative pain are of somatic or neuropathic origin. The neuropathic chronic groin pain is one of the most debilitating long term complications, which can significantly affect the patient’s satisfaction and quality of life. A proposed mechanism for the development of post- operative chronic groin pain is the inflammation and fibrosis induced by the mesh,

which is in close proximity to nerves. In addition unintentional injury or strangulation of the nerves during suturing may also contribute to the phenomenon.

The present comparative study is a small study and follow up is limited for a period of 6 months, this is the limitation of this study.

Table 7 : Feasibility of nerve recognition in Lichtenstein Hernioplasty:

Study	Nerve identified		
	Ilioinguinal nerve	Iliohypogastric nerve	Genital branch of Genitofemoral nerve
Lange et al [7] (n=40)	30(75)	38(95)	35(87.5)
Present study(n=60)	58(96.66)	60(100)	22(36.6)

The rates of identification of both Ilioinguinal and Iliohypogastric nerves is on par with other studies and though the rates of identification of Genitofemoral nerve is low, it is still technically feasible to identify all nerves in patients

Table 8: Incidence of Chronic Groin Pain:

Pain is difficult to measure objectively. Chronic pain following inguinal hernia repair is becoming a significant clinical problem affecting the quality of life. The exact incidence of chronic pain remains to be elucidated, varying in different series and only a few studies presenting long term follow up and a sufficiently large study population.

Study	Follow up time	Incidence of pain
Poobalan [8] et al	3Month	30%
Choy [9] et al	1 Year	25%
Aasvang [10] et al	1 Year	34.3%
Kumar [11] et al	21 Months	30%
Alfieri [12] et al	6 Month	9.7%
Present Study	1 Year	4.1%

Table 9 ; Incidence of pain in present study is comparable to other studies and shows a decreasing trend of pain incidence over time.

Study	Nerve Preservation Group (%)	Nerve Resection Group (%)
Ravichandran [13] et al	5	5
Picchio[14] et al	37	34
Mui [15] et al	29	8
Dittrick [16] et al	26	21
Malekpour [17] et al	21	6
Present study -1Month	46	70
-3Month	50	33.33
-6Month	33.33	6.66

Table 10 : Incidence of Altered Sensation:

Study	Time of follow up	Nerve preservation group	Nerve resection group
Malekpour [17] et al	1 Month	24	18
	6 Month	2	2
	1Yyear	0	0
Picchio [18] et al	6 Month	25	33
	1 Year	8	9
Ravichandran [13] et al	6 Month	25	45
Present study	1Month	46.67	33.3
	3Month	33.3	20
	6Month	20	13.3

Present study in comparison to other studies showed similar trend of decreasing incidence of altered sensation with time but was not statistically significant between the groups, inferring that neurectomy is not associated with increased incidence of neurosensory disturbances.

Conclusion:

A planned resection of the inguinal nerves at the time of inguinal hernia repair is associated with a decrease in the incidence of chronic post-operative pain, without any significant neurosensory disturbances. Carrying out this simple maneuver at the time of operation might decrease a major source of post-operative patient morbidity and thus it can be

considered as a routine surgical step during herniolasty. Assessing time interval in patients before they resume working and impact on quality of life can be useful and is recommended for future studies.

References:

1. Malangoni M A , Rosen M J. *Hernias*. In: Townsend, Beauchamp, Evers, Mattox Editors. *Sabiston textbook of surgery*, 19th ed. New Delhi: Saunders Elsevier 2012; 1114
2. Nienhuijs s, Staal E, Strobbe L, Rosman C, Groenewoud H, R. ; *Chronic pain after mesh repair of inguinal hernia: a systematic review*. *Am J Surg*, 2007; 194:394-400
3. Van Hanswijck de Jonge P, Loyd A, Horsfall L, Tan R, O'Dwyer PJ. *The measurement of chronic pain and health related quality of life following inguinal hernia repair: a review of literature*. *Hernia*. 2008; 12:561-56
4. Merskey H, Bogduk N. *Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms*. In *Task Force on Taxonomy of the IASP*. 2nd ed. Seattle, WA: IASP Press; 1994, 209-214.
5. Aasvang EK, Gmaehle E, Hansen JB, Gmaehle B, Forman JL, Schwartz J et al. *Predictive risk factors for persistent post herniotomy pain*. *Anesthesiology* 2010; 112:957-691
6. Parviz K Amid, Lichtenstein *Tension-free hernioplasty*. Chapter 205 In: *Fischer's Mastery of Surgery*. Josef E .Fischer, Ed. Lippincott Williams & Wilkins. 2012; p 2109
7. Lange JF, Wijsmuller AR, van Geldere D, Simons MP, Swart R, Oomen J, Kleinrensink GJ, Jeekel J, Lange JF. *Feasibility study of three-nerve-recognizing Lichtenstein procedure for inguinal hernia*. *Br J Surg*. 2009; 96:1210-1214.
8. Parviz K Amid , Lichtenstein *Tension-free hernioplasty*. In: *Fischer's Mastery of surgery* , Josef E .Fischer ,Ed.. Lippincott Williams & Wilkins . 2012; 2109.
9. Poobalan AS, Bruce J, King PM , et al. *Chronic pain and quality of life following open inguinal hernia repair*. *Br J Surg* 2001; 88:1122-1126.
10. Choy C, Shapiro k, Patel S, et al. *Investigating a possible cause of mesh migration during totally extraperitoneal (TEP) repair*. *Surg Endosc* 2004; 18:523-525.
11. Aasvang EK, Bay-Nielsen M, Kehlet H. *Pain and functional impairment 6 years after inguinal herniorrhaphy*. *hernia* 2006; 10:316-321.
12. Alfieri S, Rotondi F, Di Giorgio A, Fumagalli U, Salzano A, Di Miceli D, Ridolfini MP, Sgadari A, Doglietto G. *Influence of preservation versus division of ilioinguinal, iliohypogastric, and genital nerves during open mesh herniorrhaphy: prospective multicentric study of chronic pain*. *Ann Surg*. 2006; 243:553-558.
13. Ravichandran D, Kalambe BG et al. *Pilot randomized controlled study of preservation or division of ilioinguinal nerve in open mesh repair of inguinal hernia*. *Br J Surg* 2000; 87:1166-1167.
14. Picchio M, Palimento D, Attanasio U, Matarazzo PF, Bambini C, Caliendo A. *Randomized controlled trial of preservation or elective division of ilioinguinal nerve on open inguinal hernia repair with polypropylene mesh*. *Arch Surg*. 2004; 139:755-758.
15. Mui WL, Ng CS, Fung TM, Cheung FK, Wong CM, Ma TH, Bn MY, Ng EK. *Prophylactic ilioinguinal neurectomy in open inguinal hernia repair: a double-blind randomized controlled trial*. *Ann Surg*. 2006; 244:27-33.
16. Dittrick GW, Ridl K et al. *Routine ilioinguinal nerve excision in inguinal hernia repairs*. *Am J Surg* 2004; 188:736-740.
17. Malekpour F, Mirhashemi SH, Hajinasrolah E, Salehi N, Khoshkar A, Kolahi AA. *Ilioinguinal nerve excision in open mesh repair of inguinal hernia--results of a randomized clinical trial: simple solution for a difficult problem?* *Am J Surg*. 2008.
18. Picchio M, Palimento D, Attanasio U, Matarazzo PF, Bambini C, Caliendo A. *Randomized controlled trial of preservation or elective division of ilioinguinal nerve on open inguinal hernia repair with polypropylene mesh*. *Arch Surg*. 2004; 139:755-758.

Conflict of interest: None declared
No source of funding.