



ORIGINAL ARTICLE

THE EFFECT OF ILIOINGUINAL NEURECTOMY IN ELECTIVE INGUINAL HERNIA REPAIR ON CHRONIC POSTOPERATIVE PAIN

By

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Abstract

Aim: To evaluate the value of ilioinguinal neurectomy in controlling pain after elective inguinal hernia repair.

Methods: Fifty two male patients with unilateral primary inguinal hernia were enrolled in this comparative cross sectional study. They were randomly allocated to one of two groups (study and control). All patients in both groups were subjected to Lichtenstein hernia repair. Patients in study group were assigned for intension ilioinguinal neurectomy while patients in control group were assigned for ilioinguinal nerve preservation. All patients were assessed for chronic post operative pain and hypothesia. Severity pain scores were assessed using the visual analogue scale (VAS).

Results: The incidence of chronic pain was found to be significantly less with study group (7.7% versus 26.9%; p-value < 0.05) at 6 months postoperatively. When comparing postoperative severity pain scores in both groups in each time point, we found that study group showed significantly lower pain scores than control group starting from 2nd week postoperatively. Hypothesia was significantly more incident among study group when assessed two days and two weeks postoperatively.

Conclusion: Ilioinguinal neurectomy can result in significant decrease in chronic postoperative pain, however, postoperative temporary hypothesia is more likely to occur with this procedure.

Keywords: Iguinodynia, nerve entrapment, neuralgia.

INTRODUCTION

Repair of inguinal hernias is one of the most commonly performed surgical procedures in the world. It is generally advisable to repair hernias quickly in order to prevent complications such as organ dysfunction, gangrene, inflammation, obstruction and strangulation.

Surgical repair is usually done through using prosthetic material as polypropylene mesh for strengthening the posterior wall of the inguinal canal.⁽¹⁻⁴⁾

Many complications may occur after surgery as infection, recurrence and chronic post operative pain. The most announcing complication is the chronic post operative

pain which may be caused by a missed hernia, post operative neuroma formation, nerve entrapment in scar tissue, intra-operative nerve injury, an ongoing inflammation over the mesh, misplaced mesh, contracted mesh and wound infection.⁽⁵⁻⁸⁾

Chronic postoperative pain has been quoted in 0.7–36.7% cases of inguinal hernia repair.⁽⁵⁾ Severe chronic pain has been reported in 3% of cases.⁽⁹⁾ Defining the point at which pain becomes chronic is always difficult. It has been suggested that chronic pain is pain that is unlikely to resolve or that lasts longer than the usual healing time; various time scales have been suggested, usually 3 or 6 months.⁽¹⁰⁾

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.⁽¹¹⁾

The ilioinguinal nerve is a sensory nerve that innervates the skin over the groin region, the medial aspect of the thigh, the upper part of the scrotum and the penile root. It is normally encountered during open repair of inguinal hernia. 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 groin pain following nerve injury.^(12,13)

Several authors^(14,15) detail methods for prevention of nerve injury and stress the need for understanding inguinal anatomy and preservation of the nerve during hernia repair and inguinal incision closure however, other studies⁽¹⁶⁻¹⁸⁾ concluded that ilioinguinal neurectomy significantly decreases the incidence of chronic groin pain after hernia repair compared to routine nerve preservation.

The concept of routine neurectomy in surgery is not unique to inguinal hernia repairs. Some randomized studies have supported this practice, eg, intercostobrachial nerve excision during axillary dissection.⁽¹⁹⁾ Theoretically, excision of the ilioinguinal nerve would eliminate the possibility of postoperative neuralgia arising from entrapment, inflammation, neuroma, or fibrotic reactions. Its routine excision has been proposed as a means to avoid the troubling complication of long-term, postherniorrhaphy neuralgia.⁽¹⁸⁾ This study aimed to evaluate the effect of ilioinguinal neurectomy in controlling pain after elective inguinal hernia repair.

PATIENTS AND METHODS

The study was carried out as a comparative cross sectional study. After receiving approval from our local bioethics committee, informed consent was obtained

before surgery from fifty two hospital-admitted patients. All patients were males and complaining of inguinal hernia. They were recruited from the outpatient clinic of surgery department, Suez Canal University Hospital. Inclusion criteria were age above eighteen years, male patients and any type of inguinal hernia (direct or indirect). Those with bilateral hernia, recurrent hernia, complicated hernia (inflammation, strangulation, or irreducibility), history of previous lower abdominal incision and immunocompromised patients were excluded from the study.

Patients were randomly allocated to one of two groups (study & control) using the odd and even numbers. Study group (patients with odd numbers) was assigned for intention ilioinguinal neurectomy while control group (patients with even numbers) was assigned for preservation of the ilioinguinal nerve. Each group consisted of 26 patients.

All patients in both groups were subjected to preoperative assessment via

1. Complete medical history stressing on duration of hernia and assessment the severity of inguinal pain by visual analogue scale (VAS).
2. Physical examination focusing on the type of hernia (direct or indirect), bilateralism and presence of any complications.
3. Routine preoperative investigations (CBC, PT, PTT, liver enzymes and renal function tests).

All repairs had been performed by the same surgical team using an open tension-free mesh technique as described by Lichtenstein et al⁽²⁰⁾. Except for dealing with the ilioinguinal nerve, the surgical technique was the same in both groups. Surgery was performed with the patient under spinal and, rarely, general anesthesia. Local anesthetics were not used. Standardized postsurgical analgesic medications were parenteral non-steroidal anti-inflammatory in the early postsurgical hours.

In the study group, the ilioinguinal nerve was identified (Fig. 1) and dissected (Fig. 2) then cut sharply with a scissor just lateral to the internal inguinal ring (Fig. 3), and 4 to 5 cm of the nerve was excised (Fig. 4). The cut ends were left alone without implantation into muscle. Neither electrocautery nor suture material was used in dividing the nerve. Direct pressure was used to control bleeding when it happened.

Postoperatively, patients were discharged from the hospital after one day and were followed up on outpatient basis. Patients were assessed for postoperative pain at second day of the operation and after two weeks, three months and six months postoperatively. Also incidence of postoperative hypoesthesia was assessed at the same time intervals. Incidence of chronic postoperative pain was monitored and compared among patients in both groups.

Severity pain scores were rated on a VAS of 1 to 10. VAS has been used as a standard scale for rating pain. The reliability and validity of this scale among other pain scales has been acceptable.⁽²¹⁾ Statistical significance was calculated using Pearson χ^2 analysis for categorical data and t-test and analysis of variance (ANOVA) test for parametric data. A 2-sided probability value (p-value) less than 0.05 was considered statistically significant. Fortunately, all patients could be followed up for six months with no drop out.

RESULTS

The study was conducted among 52 male patients with primary unilateral inguinal hernia. Both groups (study and control) were matched for all clinical and personal baseline characteristics (age, residence, job, duration of hernia, type of hernia). Mean age was found to be 34.5 and 37.6 years among study and control groups respectively. Duration of hernia was estimated to be 4.1 years in study group and 4.8 years in control group. All baseline characteristics of studied patients are shown in Table 1.

Table 1. Baseline characteristics of studied patients.

		Study group (n = 26)	Control group (n = 26)	P-value
Age		34.5 ± 11.3	37.6 ± 13.8	0.4 (NS)
Duration of hernia (years)		4.1 ± 2.9	4.8 ± 1.7	0.3 (NS)
Type of hernia	Indirect	20 (76.9%)	22 (84.6%)	0.7 (NS)
	Direct	6 (23.1%)	4 (15.4%)	
Residence	Urban	14 (53.8%)	16 (61.5%)	0.8 (NS)
	Rural	12 (46.2%)	10 (38.5%)	
Job	Idle	2 (7.7%)	1 (3.8%)	0.7 (NS)
	Employee	13 (50%)	11 (42.3%)	
	Worker	8 (30.8%)	9 (34.6%)	
	Professional	3 (11.5%)	5 (19.2%)	

NS: No statistically significant difference.

The incidence of postoperative pain was statistically insignificant between both groups (57.7% in study group versus 61.5% in control group) in the second postoperative day ($P = 0.8$) while it was significantly lower in the neurectomy group versus the nerve preservation group at 2 weeks postoperative: 30.8% versus 46.2% ($P = 0.063$); 3 months postoperative: 15.4% versus 30.8% ($P = 0.025$); and 6 months postoperative: 7.7% versus 26.9% ($P = 0.017$) Table 2.

Preoperatively, the mean severity pain scores on a visual analog scale (0–10) in patients who reported pain were statistically insignificant between both groups (4.3 in study group versus 4.7 in control group). In the second postoperative day, mean severity pain scores were insignificantly different between both groups of the study (mean VAS scale was 6.5 in study group and 6.3 in control group). Starting from 2 weeks postoperatively and up to 6 months, the mean VAS scale was significantly lower among patients in the study group

than in control group Table 3.

When comparing the preoperative with the postoperative mean severity pain score in each group, we found that patients with ilioinguinal neurectomy showed significant increase in their mean VAS scale in the second postoperative day followed by significant reduction starting from the second week and up to 6 months postoperatively. The same happened in the control group but with a lesser degree of significance Table 3.

The incidence of hypoesthesia was more among patients of study group. The difference in the incidence of hypoesthesia was statistically significant when being assessed in the second day postoperative and after 2 weeks but after 3 months postoperative and 6 months the difference was not statistically significant. The highest percentage of patients with hypoesthesia in study group was reported second day postoperatively and it was 38.5% Table 4.

Table 2. Incidence of chronic pain among both groups of the study.

		Study group (n = 26)	Control group (n = 26)	p-value
Presence of post operative pain	2 nd day postoperative	15 (57.7%)	16 (61.5%)	0.8 (NS)
	2 weeks postoperative	8 (30.8%)	12 (46.2%)	0.063*
	3 months postoperative	4 (15.4%)	8 (30.8%)	0.025*
	6 months postoperative	2 (7.7%)	7 (26.9%)	0.017*

NS: No statistically significant difference.

* Statistically significant difference.

Table 3. Pre and post operative pain severity scores among both groups of the study as assessed by VAS.

VAS	Study group (n = 26)	Control group (n = 26)	P-value
Preoperatively	4.3 ± 2.9	4.7 ± 1.6	0.6 (NS)
2 nd day postoperative	6.5 ± 0.3#	6.3 ± 2.18#	0.6 (NS)
2 weeks postoperative	3.1 ± 0.8#	5.9 ± 1.05#	0.001*
3 months postoperative	2.4 ± 0.05#	3.9 ± 0.9#	0.001*
6 months postoperative	0.8 ± 0.03#	2.3 ± 0.7#	0.001*

NS: No statistically significant difference.

* Statistically significant difference between both groups.

Statistically significant difference versus preoperative value of the same group.

Table 4. Postoperative hypoesthesia among both groups of the study.

Hypoesthesia	Study group (n = 26)	Control group (n = 26)	P-value
2 nd day postoperative	10 (38.5%)	2 (7.7%)	0.02*
2 weeks postoperative	8 (30.8%)	1 (3.8%)	0.03*
3 months postoperative	4 (15.4%)	1 (3.8%)	0.3 (NS)
6 months postoperative	2 (7.7%)	1 (3.8%)	0.9 (NS)

NS: No statistically significant difference.

* Statistically significant difference.



Fig 1. Identification of the ilioinguinal nerve.

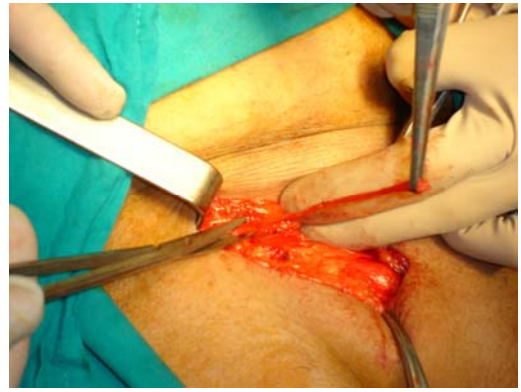


Fig 3. Cutting the ilioinguinal nerve sharply with a scissor.

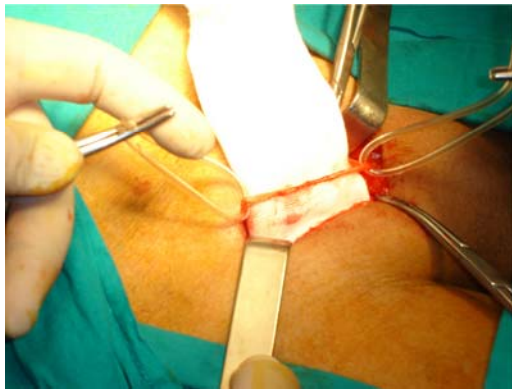


Fig 2. Dissected ilioinguinal nerve.



Fig 4. The excised segment of the ilioinguinal nerve.

DISCUSSION

Chronic inguinal pain is one of the most significant complications following inguinal hernia repair. It can significantly affect the patient's satisfaction and quality of life after the operation.⁽²²⁾ The reported frequency of postoperative pain varies widely. In 2001, Pooblan et al⁽¹⁰⁾ reviewed the literature of chronic pain after inguinal hernia repair and found incidences ranging from 0% to 63%.

A proposed mechanism for the development of postoperative chronic pain is the inflammation and fibrosis induced by the mesh, which is in close proximity to the ilioinguinal nerve. In addition, unintentional injury or strangulation of the ilioinguinal nerve during suturing may also contribute to the phenomenon^(18,23) hence; routine ilioinguinal nerve excision has been proposed as a means to avoid this complication.⁽¹⁷⁾

The earlier study to investigate the effect of this procedure was carried out by Ravichandran and his colleagues.⁽²⁴⁾ They conducted a pilot study comparing preservation or division of the ilioinguinal nerve in inguinal hernia open mesh repairs. Twenty patients with bilateral hernias were randomized to nerve preservation

on one side and division on the other. At 6 months postoperatively, pain was present in 1 of 20 patients (5%) on the nerve-preserved side versus 0 of 20 patients (0%) on the nerve division side. Numbness was present in 0 of 20 (%) on the nerve-preserved side versus 2 of 20 patients (10%) on the nerve divided side. These differences were all nonsignificant and led the authors to conclude that elective division of the ilioinguinal nerve was not associated with a significant decrease in postoperative pain in inguinal hernia repairs. However, subsequent studies^(16-18,25) with larger sample sizes have shown statistically significant decrease in the incidence of postoperative pain in the nerve excision group versus the nerve preservation group.

In the present study, the incidence of chronic inguinal pain was significantly lower in neurectomy group compared to nerve preservation group at six months postoperatively (7.7% versus 26.9). This is matched with most of the previous literatures⁽¹⁶⁻¹⁸⁾ that was done after the earliest study of Ravichandran et al.⁽²⁴⁾ The difference between these studies was in the incidence of the chronic pain at six months postoperatively rather than in significance between the two groups. Malekpour et al⁽¹⁶⁾ reported incidence of 6% versus 21% while Dittrick et al⁽¹⁷⁾ reported 3% versus 26% and Mui et al⁽¹⁸⁾ reported

8% versus 28.6%. Mirza et al⁽²⁵⁾ conducted a case descriptive study without control group of nerve preservation and he reported incidence of 6% at six months postoperatively.

On the other hand, a study done by Picchio M⁽²⁶⁾ has failed to show any relationship between the division or preservation of the ilioinguinal nerve and the risk of chronic pain. It could be related to the large number of the contributing surgeons with different experiences and to the different used surgical technique as the study was conducted by many surgeons in 4 Italian hospitals and used the technique described by Trabucco⁽²⁷⁾ in which the mesh was positioned without sutures in the floor of the inguinal canal and in the lateral space under the aponeurosis of the external oblique muscle.

The present study showed that the mean severity pain scores (as assessed by VAS) were insignificantly different between both groups in the second postoperative day while it was significantly lower among patients in the study group than in control group in 2 weeks postoperatively and up to 6 months. Although Malekpour et al⁽¹⁶⁾ and Dittrick et al⁽¹⁷⁾ assessed the mean severity pain scores at different time interval (1st postoperative day, 1 month, 6 months, 1 year and 3 years), yet their results were in accordance with our results and both reported significant decrease in pain scores among nerve excision group compared to the nerve preservation group.

In the present study, we have estimated significantly higher incidence of postoperative hypoesthesia with ilioinguinal neurectomy at 2nd day and after 2 weeks postoperatively. This difference has turned out to be insignificant after 3 months onward. This was supported by the findings of Picchio M.⁽²⁶⁾

In conclusion, ilioinguinal neurectomy has resulted in significant decrease in the incidence of chronic pain which is a common complication following inguinal hernia repair. Also, pain severity reported with ilioinguinal neurectomy was much less than that reported in control group. However, hypoesthesia was significantly more incident with ilioinguinal neurectomy for 2 weeks postoperatively.

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