

INGUINAL HERNIOPLASTY; ELECTIVE NEURECTOMY FOR POSTOPERATIVE NEURALGIAS

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ABSTRACT.... Introduction: Chronic pain following inguinal hernia repair is becoming a significant clinical problem, involving increased number of patients and surgeons. Much controversy exists regarding treatment. Elective division of the nerves has been proposed to reduce the risk of chronic post operative pain. **Objectives:** To evaluate the effectiveness of elective neurectomy during open hernia mesh repair, in reducing postoperative pain. **Materials and methods: Settings:** All patients admitted in SU11 department of surgery, Allied Hospital Faisalabad were included in study. Study was started after the approval of synopsis on with inguinal hernia 2nd Feb, 2007 to Aug, 2007. 100 patients of inguinal hernias were divided into 2 groups, 50 in each group i.e. group A & group B. The last patient was registered in the first week of July. convenience nonprobability sampling was used for location of patients in two groups. **Results:** On day one the pain was assessed in the two groups i.e. Group A and group B (convenience non probability sampling technique used for patient grouping). It was found to be absent in 24/50 (48 %) and 18/50 (36 %), mild in 10/50 (20 %) and 12/50 (24 %), it was moderate in 10/50 (20 %) and 10/50 (20 %) and was severe in 6/50 (12%) and 10/50 (20%) in the two groups respectively. One week after operation, in groups A and B, respectively, pain assessed with the use of the 4-point verbal scale was absent in 45 patients (90%) and 37 patients (74%), mild in 3/50 (6%) and 4/50 (8%), moderate in 2/50 (4%) and 6/50 (12%), and severe in none and 3/50 (6%). Postoperative pain was not correlated with the presence of preoperative pain, and no correlation was evidenced in the 2 subgroups. One month after operation, follow-up visits were performed in group A patients and group B patients. In particular, pain was absent in 46/50 (92%) patients in group A and 41/50 (82%) patients in group B. It was mild in 2 (6%) and 6/50 (12 %), moderate in 2/50 (4%) and 2/50 (4 %) none of the patients with elective neurectomy had pain at follow up of one month and 1 (2 %) one patient without elective neurectomy had pain. The numbness was assessed by checking sense of touch around the operated area. The difference found between the 2 groups with respect to the presence of numbness was 15/50 (30 %) and 7/50 (14%) in the two groups i.e. group A and group B respectively at day 1 and 12/50 (24%) and 7/50 (14%) at follow up of one week and it was 5/50 (10%) and 2/50(4%) at one month in the two groups. **Conclusions:** When performing lichtenstein inguinal hernia repair, routine ilioinguinal, iliohypogastric and genital branch of genitofemoral nerves neurectomy is a reasonable option.

Key words: Inguinal Hernia, Lichtenstein's Repair, Elective neurectomy, Post Operative Neuralgia

OBJECTIVE

To evaluate the effectiveness of elective neurectomy during open hernia mesh repair, in reducing postoperative pain.

MATERIALS AND METHODS

SETTING: SU11 department of surgery, Allied Hospital Faisalabad.

DURATION

Six months

SAMPLE SIZE

100 patients of inguinal hernias, 50 in each group.

SAMPLING TECHNIQUE

Convenience non-probability sampling.

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INCLUSION CRITERIA

All patients of inguinal hernias, above 18 years, either sex, with clinical evidence of inguinal herniae. (Swelling, reducibility, cough impulse taken as clinical evidence in all patients)

EXCLUSION CRITERIA

Diabetics, hypertensives, and those afflicted with chronic illnesses e.g. COPD were excluded from this study.

STUDY DESIGN

quasi-experimental study.

DATA COLLECTION PROCEDURE

100 patients fulfilling inclusion criteria were taken from opd. Diagnosis was made purely on clinical examination (Swelling, reducibility, cough impulse). Demographical variables like age, socioeconomic status of the patients were collected on the proforma for record after informed consent. History and clinical examination recorded for exclusion of preoperative pain.

All patients were explained risks and benefits of the procedure. Confidentiality was ensured. Patients fit for surgery underwent tension free hernioplasty under local anesthesia on elective list. The patients were randomly allocated into two groups using random number table. Fifty patients in each group, Group A underwent tension free hernioplasty with elective neurectomy. Group B underwent simple tension free hernioplasty. The confounding variables like wound infection, seroma and haematoma formation were controlled through matching. Patients in both groups were evaluated for pain on standard pain criteria (none, mild, moderate, severe) at day 1, 1 week and 1 month on the proforma. Bias was controlled by standardization of procedure (Tension free hernioplasty under local anesthesia on elective list).

DATA ANALYSIS

The collected information were entered into SPSS statistical version 10.0 and analyzed. The study variables were age, sex and complaint of postoperative pain. These variables were analyzed by using simple descriptive statistics. Mean and standard deviation for numerical variables like age and frequency, for

qualitative variables like sex and pain (none, mild, moderate, and severe). The outcome variable was pain. It was qualitative variable. The two groups were assessed on outcome variable by applying chi square test. The other variables in examination and investigations were either positive or negative and were presented as frequency distribution table. A p value <0.05 was considered significant.

RESULTS

All patients were examined on day 1, 1 week, and 1 month postoperatively. Because patients with neuropathic pain have few or no objective signs, follow-up by physical examination beyond 1 month did not seem necessary. Both groups were compared with respect to age, sex, and presence of preoperative pain. On day one the pain was assessed with the use of the 4-point verbal scale in the two groups i.e. Group A and group B it was found to be absent in 24/50 (48 %) and 18/50 (36 %), mild in 10/50 (20 %) and 12/50 (24 %), it was moderate in 10/50 (20 %) and 10/50 (20 %) and was severe in 6/50 (12%) and 10/50 (20%) in the two groups respectively.

One week after operation, in groups A and B, respectively, pain assessed with the use of the 4-point verbal scale was absent in 45 patients (90%) and 37 patients (74%), mild in 3/50 (6%) and 4/50 (8%), moderate in 2/50 (4%) and 6/50 (12%), and severe in none and 3/50 (6%). Postoperative pain was not correlated with the presence of preoperative pain, and no correlation was evidenced in the 2 subgroups.

One month after operation, follow-up visits were performed in group A patients and group B patients. Pain assessed with the use of the 4-point verbal scale.

Pain was absent in 46/50 (92%) patients in group A and 41/50 (82%) patients in group B. It was mild in 2 (6%) and 6/50 (12 %), moderate in 2/50 (4%) and 2/50 (4 %) none of the patients with elective neurectomy had pain at follow up of one month and 1 (2 %)one patient without elective neurectomy had pain. The difference found between the 2 groups with respect to the presence of numbness was 15/50 (30 %) and 7/50 (14%) in the two

groups i.e. group A and group B respectively at day 1 and 12/50 (24%) and 7/50 (14%) at followup of one week and it was 5/50 (10%) and 2/50(4%) at one month in the two groups.

There was only one female patient presented during the study period rest of all the patients were male in both the groups (male/female 49/1 and 50/0) and mean age (41.68 and 41.78 years).

Table-I. Response of patients in different groups on day one, after one week and after one month

Pain Grade	Response on day one		Response on day one		Response on day one	
	Group A (n = 50)	Group B (n = 50)	Group A (n = 50)	Group B (n = 50)	Group A (n = 50)	Group B (n = 50)
Absent	24 (48%)	18 (36%)	45 (90%)	37 (74%)	46 (92%)	41 (82%)
Mild	10 (20%)	12 (24%)	3 (6%)	4 (8%)	2 (4%)	6 (12%)
Moderate	10 (20%)	10 (20%)	2 (4%)	6 (12%)	2 (4%)	2 (4%)
Severe	6 (12%)	10 (20%)	0 (0%)	3 (6%)	0 (0%)	1 (2%)

Table-II. Comparison of pain in different groups on day one

Parameter	DF	Estimate	Error	Limits		Square	Pr> Chisq
Intercept 1	1	-0.5580	0.2751	-1.0973	-0.0188	4.11	0.0425
Intercept 2	1	0.3500	0.2725	-0.1842	0.8841	1.65	0.1991
Intercept 3	1	1.4417	0.3194	0.8157	2.0677	20.38	<.0001
Group A	1	0.4647	0.3669	-0.2543	1.1838	1.60	0.2053
Group B	0	0.0000	0.0000	0.0000	0.000		
Exp (Long Or 12)		1.5916	0.7754	0.7754	3.2669		

Table-III. Comparison of pain in different groups after one week

Parameter	DF	Estimate	Standard Error	Wald 95% confidence Limits		Cis-square	Pr> Chisq
Intercept 1	1	1.0137	0.3226	0.3815	1.6459	9.88	0.0017
Intercept 2	1	1.6089	0.3672	0.8892	2.3285	19.20	<.0001
Intercept 3	1	3.0272	0.6091	1.8334	4.2211	24.70	<.0001
Group A	1	1.2093	0.5692	0.0937	2.3249	4.51	0.0336
Group B	0	0.0000	0.0000	0.0000	0.0000		
Exp (Long Or 12)		3.3512	1.9075	1.0982	10.2260		

Table-IV. Comparison of pain in different groups after one month

Parameter	DF	Estimate	Standard Error	Wald 95% confidence Limits		Cis-square	Pr> Chisq
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Intercept 1	1	1.5258	0.3672	0.8060	2.2455	17.26	<.0001
Intercept 2	1	2.5821	0.5031	1.5961	3.5681	26.34	<.0001
Intercept 3	1	4.2365	1.0254	2.2267	6.2462	17.07	<.0001
Group A	1	0.9081	0.6369	-0.3403	2.1565	2.03	0.1539
Group B	0	0.0000	0.0000	0.0000	0.0000		
Exp (Long Or 12)		2.4796	1.5794	0.7116	8.6408		

The positive values 0.4647, 1.2093, 0.9081 for the parameter estimate for group A indicates a tendency towards the lower numbered categories of the pain grades (i.e. absent or mild pain) relative to the group B on day one, after one week and after one month respectively. It means the Group A is responding better than the Group B. the difference in effects of group A with respect to Group B is not statistically significant on day one and after one month as p-values are 0.2053 and 0.1539 but it is statistically significant after one week as p-values is 0.0336. In the early postoperative period, the incidence of neuralgia was lower in the neurectomy group as compared to nerve preservation group. The incidence of paresthesia in the distribution of the nerves on application of Chi-Square was 3.730 with P- value of 0.053 on day one. It was 1.624 with P- value of 0.202 on one week and at one month it was 1.382 with P- value of 0.240. This shows some difference in the two groups with significance in the P value at one week for post operative neuralgias. Post operative numbness has some significance on day 1. Later there was no such significant difference in the two groups. A total of 100 patients were randomized with 50 patients in each group. The mean age of patients in group A and group B were 41.68 and 41.78 respectively. The 2 groups were comparable with regard to method of anesthesia, laterality of hernia, baseline pain measurement.

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 postoperative pain syndrome. Several explanations may be offered, namely, the low recurrence rates associated with the use of mesh repair that have shifted the hernia surgeons' attention from recurrence to other outcome parameters and the fact that patients today are more aware of pain syndromes. However, more and more often, patients come to our attention complaining of groin pain, after a hernia operation performed elsewhere, both for a second opinion regarding treatment. Postoperative pain is a significant problem after open inguinal hernia repair. Moderate or severe pain was still present in 11% of patients during mobilization and in 5% at rest, 4 weeks after operation in the study by Callesen et al¹. In another study, 19 per cent reported some degree of pain, and 6 per cent had moderate or severe pain² in a large-scale study,³ chronic pain was present in 28.7% of patients, leading to some degree of functional impairment in 11% of patients. In another large-scale study,⁴ chronic pain was present in 43% of patients, and it was reported as severe or very severe in 3% of cases. Chronic pain occurred in 30% of patients in the study by Poobalan et al⁵. In case of our study there was post operative neuralgia in 52% of patients having elective neurectomy and 64% of patients not undergone elective neurectomy on Day 1. The post operative neuralgia was 10% in patients of elective neurectomy and it was 26% in non neurectomy patients at follow up of one week. At one month followup 8% of neurectomy patients had post operative neuralgia where as it was 18% in case of non neurectomy patients. The results are comparable at different stages of follow up with different studies. There is no gross difference in our study and other studies. The tension-free repair of inguinal hernia with mesh prosthesis should lead to less postoperative pain.

However, acute postoperative pain was similar in patients who underwent conventional or mesh hernia repair⁶ in a recent meta-analysis of randomized controlled trials, comparing hernia repair with or without mesh, the results showed a significant reduction in chronic pain when mesh was applied; however, there is still a relevant proportion of patients (10.7%) who complained of persisting pain after hernia repair with mesh⁷ no correlation was found between the presence of preoperative pain and the occurrence of postoperative pain. According to other studies,⁸ chronic pain was significantly related to the presence and intensity of postoperative pain, 53.6% of patients were still reporting some pain, and it was moderate to severe in 10.6%.

Damage to 1 or more of the 3 nerves passing through the surgical field is suspected to be one of the main causes of chronic postherniorrhaphy pain. This theory is supported by the association between chronic pain and sensory disturbances⁹. A nerve may be damaged during operation as a result of perineural fibrosis, entrapment by staples, sutures, or prosthetic materials, and direct lesions due to stretching, contusion, electrical injury, and partial or complete division of the nerve¹⁰. Elective division of the ilioinguinal nerve was proposed by hernia surgeons to reduce the risk of its inadvertent damage and consequent chronic pain. Wantz¹¹ showed that chronic pain was not present in 546 patients who underwent hernia repair with elective division of the ilioinguinal nerve, whereas it was seen in patients with the nerve preserved. No relation between ilioinguinal nerve preservation or elective division and chronic pain was reported in a large study by Cunningham et al¹². The study by Ravichandran et al¹³ was the first to assess the effect of division of the ilioinguinal nerve in a randomized setting.

After inguinal hernia repair, sensory changes are common. In the study by Ravichandran et al,¹³ loss of sensation in the territory supplied by the ilioinguinal nerve occurred in 40% to 45% of patients when the nerve was divided and in 5% to 25% of cases when it was preserved. Our data confirm that elective transection of the nerves leads to an increase in the proportion of patients who complain of a decrease in pain and touch

sensation in the postoperative period with respect to those with preserved nerve. Our data showed that 30% of patients undergoing elective neurectomy had numbness as compared to 14% of non neurectomy patients on Day 1. It was 24% and 14% at follow up of one week and 10% and 4% at one month. There was a significant difference in the neurosensory disturbance. However there was a steady improvement in neurosensory disturbance in neurectomy patients with passage of time.

The results of this study demonstrate that prophylactic excision of ilioinguinal nerve during Lichtenstein inguinal hernia repair decreases the incidence of exertional chronic groin pain after surgery, as shown in other studies^{14,15}.

The first randomized trial to address postoperative neuralgia problem by Ravichandran et al¹³ was underpowered and no definite conclusion could be made.

Larger clinical trials involving more patients and longer follow-up are warranted to study the long-term effect of prophylactic neurectomy in patients undergoing Lichtenstein repair. Lastly, although we are able to show that prophylactic neurectomy decreases the incidence of chronic postoperative pain, the exact reasoning behind this phenomenon remains unknown. Further histologic or nerve conduction studies are required to deduce the exact mechanism.

CONCLUSION

To reduce the incidence of this incapacitating complication 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. And preferably nerves should be identified and preserved. To that end, we suggest the following:

1. Elective neurectomy including all three nerves of the inguinal region.
2. Avoid making the external ring too small.

3. Avoid incising the subcutaneous adipose tissue hastily to prevent injury to the prematurely surfaced branches of the ilioinguinal or iliohypogastric nerves.
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REFERENCES

1. Callesen T, Bech K, Nielsen R, et al. **Pain after groin hernia repair.** Br J Surg. 1998; 85:1412-4.
2. Callesen T, Bech K, Kehlet H. **Prospective study of chronic pain after groin hernia repair.** Br J Surg. 1999; 86:1528–31.
3. Bay-Nielsen M, Perkins FM, Kehlet H. **Pain and functional impairment 1 year after inguinal herniorrhaphy: a nationwide questionnaire study.** Ann Surg. 2001; 233:1–7.
4. Courtney CA, Duffy K, Serpell MG, et al. **Outcome of patients with severe chronic pain following repair of groin hernia.** Br J Surg. 2002; 89:1310–4.
5. Poobalan AS, Bruce J, King PM, et al. **Chronic pain and quality of life following open inguinal hernia repair.** Br J Surg. 2001; 88:1122–6.
6. Barth RJ, Burchard KW, Tosteson A, Sutton JE, Colacchio TA, Henriques HF, et al. **Short-term outcome after mesh or shouldice herniorrhaphy: a randomized, prospective study.** Surgery. 1998 Feb; 123(2): 121-6.
7. EU Hernia Trialists Collaboration. **Repair of groin hernia with synthetic mesh: meta-analysis of randomized controlled trials.** Ann Surg. 2002 Mar; 235(3): 322-32.
8. Cunningham J, Temple WJ, Mitchell P, Nixon JA, Preshaw RM, Hagen NA. **Cooperative hernia study. pain in the postrepair patient.** Ann Surg. 1996 Nov; 224(5): 598-602.
9. Picchio M, Pallimento D, Attanasio U, et al. **Randomized controlled trial of preservation or elective division of ilioinguinal nerve on open inguinal hernia repair with polypropylene mesh.** Arch surg. 2004;139:755–8.
10. Amid PK. **A 1-stage surgical treatment for postherniorrhaphy neuropathic pain triple neurectomy and proximal end implantation without mobilization of the cord.** Arch Surg.2002;137:100-4.
11. Wantz GE. **Testicular atrophy and chronic residual neuralgia as risks of inguinal hernioplasty.** urg Clin North Am 1993; 73:571–81.
12. Cunningham J, Temple WJ, Mitchell P, et al. **Cooperative hernia study: pain in the postrepair patient.** Ann Surg. 1996; 224:598–602.
13. Ravichandran D, Kalambe BG, Pain JA. **Pilot randomized controlled study of preservation or division of ilioinguinal nerve in open mesh repair of inguinal hernia.** Br J Surg. 2000; 87:1166–7.
14. Mirza MK, Hameed F, Sheikh SM, Bashir M. **Ilioinguinal neurectomy in open inguinal hernia mesrepair.** Ann King Edward Med Coll 2005; 11(4): 404-6.
15. Mui WL, Ng CS, Fung TM, heung FK, Wong CM, Ma TH, et al. **Prophylactic ilioinguinal neurectomy in open inguinal hernia repair: a double-blind randomized controlled trial.** .Ann Surg. 2007 Apr; 245(4): 663.