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Original Research Article

Prophylactic ilioinguinal neurectomy in open inguinal hernia repair: a randomized control trial

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ABSTRACT

Background: Inguinal neuralgia is one of the important complications of hernia repair which occurs due to entrapment, neuroma or fibrotic reactions involving the ilioinguinal nerve. Hence the excision of ilioinguinal nerve should theoretically eliminate the possibility of inguinal neuralgia. But routine ilioinguinal neurectomy is still controversial and is not widely accepted. Hence a study was conducted to evaluate the effect of prophylactic ilioinguinal neurectomy in open inguinal hernia repair.
Methods: A prospective study was conducted in the General Surgery Department in a tertiary center for a period of 20 months, from December 2011 to July 2013. The patients were randomly allocated to either group A or group B by block randomized technique. Group 'A' patients underwent neurectomy of ilioinguinal nerve whereas the ilioinguinal nerve in group 'B' patients was safeguarded.
Results: A total of 60 patients were studied with 30 patients each in group A and group B. During vigorous activities, more group B patients had pain compared to group A patients at 4-month [15 (50%) vs. five (17%); p=0.006; Chi-square test] and 8-month follow-up [15 (50%) vs. five (17%); p=0.006; Chi-square test].
Conclusions: Inguinal neuralgia is a significant and debilitating complication following hernia repair. The prophylactic neurectomy can be an appropriate solution in the prevention of chronic groin pain following inguinal hernia repair and can be considered as an ideal inclusion into the standard hernia repair procedures.

Keywords: Ilioinguinal nerve, Inguinal hernia, Inguinal neuralgia, Neurectomy

INTRODUCTION

Inguinal neuralgia is one of the important complications of hernia repair which is seldom discussed. The incidence of inguinal neuralgia varies between six to 29% for Lichtenstein repair.[1] It occurs due to entrapment, neuroma or fibrotic reactions involving the ilioinguinal nerve. Hence the excision of ilioinguinal nerve should theoretically eliminate the possibility of inguinal neuralgia. The concept of routine neurectomy in surgery is not unique to inguinal hernia repairs. Routine neurectomy of greater auricular nerves and intercostobrachial nerves is often performed during neck and axillary dissections.[2] But routine ilioinguinal neurectomy is still controversial and is not widely accepted.[3] Hence a study was conducted to evaluate the effect of prophylactic ilioinguinal neurectomy in open inguinal hernia repair.

METHODS

A prospective study was conducted in the General Surgery Department in a tertiary center for a period of 20 months, from December 2011 to July 2013.

Inclusion and exclusion criteria

A total of 60 patients were studied. All patients with an inguinal hernia were included in the study. Patients with a complicated hernia, recurrent hernia, peripheral neuropathy, impaired cognition, or history of previous lower abdominal surgery were excluded.

The ethical approval for the study was taken from "Institute Ethics Committee". The patients with an inguinal hernia presenting to the Department of General Surgery were screened for eligibility. A written informed consent was obtained from the patient for the study. After preliminary investigations, and pre-anesthetic evaluation, patients were taken up for open Lichtenstein repair.

The patients were randomly allocated to either group A or group B by block randomized technique. Study participants and the data analyst were blinded during the study. All surgeries were performed in a single surgical unit. As per CDC guidelines, all patients received 1gm intravenous Ceftriaxone as prophylaxis at the time of anesthetic induction.[4]

Group 'A' patients underwent neurectomy of ilioinguinal nerve whereas the ilioinguinal nerve in group 'B' patients was safeguarded. The pain was evaluated using Visual Analogue Scale (VAS).[5] The pain scale was represented by a 10cm long straight line, with no pain at one end and intolerable pain at the other end. All patients received intramuscular diclofenac as analgesic every eight hours for two days post-operatively and sos later. Paraesthesia was assessed by the Semmes-Weinstein Monofilament test and evaluated after comparison with the opposite side.[6]

All the patients were discharged when fit and were asked to come for regular follow up at one month, four months, eight months, and later if required. All patients were followed-up for post-operative pain, paraesthesia, interference with activities of daily living, use of analgesics and visits to a general practitioner for pain. At the end of follow up, patients were evaluated using the modified SF-36 questionnaire.[7]

Statistical analysis

Descriptive statistics were expressed as mean ± standard deviation and percentage. The difference between the two groups, group A and group B, were assessed using independent samples T-test, chi-square test, and Fischer's exact test. A p-value less than 0.05 was considered significant.

RESULTS

A total of 60 patients were studied with 30 patients each in group A and group B. The mean age of the study population was 47.7±14.9 years. Fifty-six (83%) patients were males. Thirty-eight (63%) patients had indirect inguinal hernia while 22 (37%) patients had a direct inguinal hernia. Thirty (50%) patients had pre-operative pain.

There was no significant difference between group A and B regarding Mean age (46.8±15.2 years vs. 47.5±13.8 years; p=1; independent samples 't' test), gender, and preoperative pain (group A: 17/30 vs. group B: 13/40; p=0.3; Pearson's chi-square test).

None of the patients in group A (neurectomy) had pain at rest and during normal daily activities while three (10%) group B patients had pain at rest during 4-month and 8-month post-surgery but there was no statistical significance (Table 1, Table 2).

Table 1: Pain at rest.

Pain at rest	Group A (n=30)	Group B (n=30)	Fischer's exact test (p-value)
1 month	2 (7%)	3 (10%)	1
4 months	0 (0%)	3 (10%)	0.2
8 months	0 (0%)	3 (10%)	0.2

Table 2: Pain during normal daily activities.

Pain	Group A (n=30)	Group B (n=30)	Fischer's exact test (p-value)
1 month	3 (10%)	4 (13%)	1
4 months	0 (0%)	3 (10%)	0.2
8 months	0 (0%)	3 (10%)	0.2

Three (10%) patients in group B and none of the group A patients had pain during moderate activities during 4-month and 8-month post-surgery (Table 3).

Table 3: Pain after moderate activities.

Pain	Group A (n=30)	Group B (n=30)	Fischer's exact test (p-value)
1 month	5 (17%)	6 (20%)	1
4 months	0 (0%)	3 (10%)	0.2
8 months	0 (0%)	3 (10%)	0.2

Table 4: Pain after vigorous activities.

Pain	Group A (n=30)	Group B (n=30)	Chi-square test (p value)
1 month	15 (50%)	17 (57%)	0.6
4 months	5 (17%)	15 (50%)	0.006
8 months	4 (13%)	11 (37%)	0.04

During vigorous activities, more group B patients had pain compared to group A patients at 4-month [15(50%) vs. five (17%); p=0.006; Chi-square test] and 8-month follow-up [15(50%) vs. five (17%); p=0.006; Chi-square test] (Table 4). At 8-month post-surgery, none of group A and one (3%) patient in group B had hyperesthesia (Table 5).

Table 5: Postoperative hyperesthesia.

Postoperative hyperesthesia	Group A (n=30)	Group B (n=30)	Fischer's exact test p-value
1 month	8 (27%)	11 (37%)	0.4
4 months	3 (10%)	01 (3%)	0.3
8 months	0 (0%)	01 (3%)	1

Quality of life

Limitation of physical activities was severely affected in four (13%) of group A patients and three (10%) of group B patients (Table 6). Three (10%) patients in group B and none of group A patients had any limitation of social activities (Table 7).

Table 6: Quality of life- physical functioning.

Quality of life	Group A (n=30)	Group B (n=30)	Fischer's exact test p-value
No limitation of activities	26 (87%)	27 (90%)	0.7
Mild limitation of activities	0 (0%)	0 (0%)	1
Severe limitation of activities	4 (13%)	3 (10%)	0.7

Table 7: Quality of life- social health.

Quality of life	Group A (n=30)	Group B (n=30)	Fischer's exact test p-value
No limitation of activities	26 (87%)	27 (90%)	0.7
Mild limitation of activities	0 (0%)	3 (10%)	0.2
Severe limitation of activities	0 (0%)	0 (0%)	1

DISCUSSION

Repair of an inguinal hernia is one of the most common surgeries performed worldwide. Like any other surgery, inguinal hernia repair is not without complications. Repair of an inguinal hernia is associated with bleeding, hematoma, injury to vital structures, wound infection, secondary hydrocele, ischemic orchitis, urinary retention, seroma, recurrence, and inguinal neuralgia. The inguinal neuralgia is one of the chronic devastating circumstances which affect the quality of life. Hence, we conducted a study to evaluate the effect of prophylactic ilioinguinal neurectomy during inguinal hernia repair.

The mean age of our study group was 47.7±14.9 years, which was comparable to other studies such as Malekpour et al.[8] Group A and B were comparable regarding the mean age and gender.

Both the groups were comparable regard to the preoperative pain. The preoperative pain is due to pull on the mesentery or omentum. This pain is different from postoperative pain.

Direct comparison of pain between our study and other studies is not possible because of the different available methods used to determine the severity of pain like the Visual Analogue Scale (VAS), Verbal Rating Scale ('VRS), 10 point Likert scale, Mc Gill pain questionnaire etc.

In the present study, a validated questionnaire was used to evaluate the pain severity. In this, the patients were asked about the presence or absence of pain in the groin, at rest, pain experienced during normal daily activities, pain after moderate activities, and pain after vigorous activities. The questionnaire was updated at every follow-up, which was at one, four, and eight months.

The chronic pain after hernia repair can be either nociceptive or neuropathic. The nociceptive pain is a dull, tugging, or burning type of pain which occurs after lifting or stretching. This pain is secondary to sutures involving the ligaments. The neuropathic pain is a brief, sharp, jabbing or electrical pain occurs spontaneously or provoked by movement. This is due to abnormal nerve conduction. This can be peripherally or centrally generated and sympathetically maintained. The classic causes of inguinal neuralgia after hernia repair is osteitis pubis and ilioinguinal nerve entrapment, the latter being the most common entity. The neuroma or fibrotic reactions involving the ilioinguinal nerve is also common after hernia surgery and can cause inguinal neuralgia. The implantation of mesh, which induces scar formation through increased inflammation, also has been suggested as a cause of neuropathic pain.

In the neurectomy study group, pain at rest was present in 7% patients at one month which subsided by 8 months, whereas in the group B where the nerve was safeguarded, it was present in 10% patients at 1 month and persisted beyond eight months postoperatively. In the study by Picchio et al, pain occurred in 5% and 6% of the studied patients in the neurectomy and non-neurectomy group, respectively, at one month.[3] This subsided to 3% (neurectomy study group) and 2% (non-neurectomy group) of patients at one year.

Pain experienced during normal daily activities and moderate activities were found to be insignificant between both the study groups. The results are consistent with those of Mui et al.[9]

Pain after vigorous activity and on walking

Significant differences were found in the incidence of pain after vigorous activity, between the neurectomy group and the group where the nerve was safeguarded at four and eight months follow up (17% v/s 50%; p=0.006 and 13% vs. 37%; p=0.04; chi-square test). These findings are consistent with Malekpour et al and Dittrick et a1.[8,10] However, Picchio et a1 reported an almost equal incidence of pain after one year.[3]

In this study, no significant difference was found regarding hyperesthesia. These results are comparable with those of Mui et a1 and Dittrick et a1.[9,10] There was no significant difference in the health-related quality of life between the two study groups. This compliment the findings of Mui et al.[9]

CONCLUSION

Inguinal neuralgia is a significant and debilitating complication following hernia repair. The incidence of pain, as well as the severity of pain, is far higher in the group where the ilioinguinal nerve was safeguarded. This indicates that prophylactic neurectomy can be an appropriate solution in the prevention of chronic groin pain following inguinal hernia repair and can be considered as an ideal inclusion into the standard hernia repair procedures.

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REFERENCES

1. 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.
2. Abdullah TI, Iddon J, Barr L, Baildam AD, Bundred NJ. Prospective randomized controlled trial of preservation of the intercostobrachial nerve during axillary node clearance for breast cancer. Br J Surg. 1998;85:1443-5.
3. 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;139:755-8.
4. Manjunath DA, Gurugunti UD, Radhakrishna V. Laparoscopic transabdominal preperitoneal inguinal repair versus open Lichtenstein repair: a randomized control trial. Int Surg J. 2018;5(1):77-81.
5. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care Res. 2011;63:S240-S252.
6. Baraz S, Zarea K, Shahbazian HB, Latifi SM. Comparison of the accuracy of monofilament testing at various points of feet in peripheral diabetic neuropathy screening. Journal of Diabetes and Metabolic Disorders. 2014;13:19.
7. White DK, Wilson JC, Keysor JJ. Measures of adult general functional status. SF-36 Physical Functioning Subscale (PF-10), Health Assessment Questionnaire (HAQ), Modified Health Assessment Questionnaire (MHAQ), Katz Index of Independence in Activities of Daily Living, Functional Independence Measure (FIM), and Osteoarthritis Function-Computer Adaptive Test (OA-Function-CAT). Arthritis Care Res. 2011;63:S297-S307.
8. 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;195:735-40.
9. Mui WL, Ng CS, Fung TM, Cheung FK, Wong CM, Ma TH, et al. Prophylactic ilioinguinal neurectomy in open inguinal hernia repair: a double-blind randomized controlled trial. Ann Surg. 2006;244:27-33.
10. Dittrick GW, Ridl K, Kuhn JA, McCarty TM. Routine ilioinguinal nerve excision in inguinal hernia repairs. Am J Surg. 2004;188(6):736-40.

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