

Review Article

Peroperative Nerve Preservation During Open Hernia Repair

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Abstract

Background: Peroperative identification and subsequent division or preservation of the inguinal nerves during open hernia repair may influence the incidence of chronic postoperative pain.

Methods: A systematic literature review was performed to identify studies investigating the influence of different types of nerve management.

Results: Based on three randomized studies the pooled mean percentage of patients with chronic pain after identification and division of the ilioinguinal nerve was similar to that after identification and preservation of the ilioinguinal nerve. Two cohort studies suggested that the incidence of chronic pain was significantly lower after identification of all inguinal nerves compared with no identification of any nerve. Another cohort study reported a significant difference in the incidence of chronic pain in favour of identification and facultative pragmatic division of the genital branch of the genitofemoral nerve compared with no identification at all.

Conclusion: The nerves should be identified during open hernia repair. Division of and preservation of the ilioinguinal nerve show similar results. Incidence of postoperative chronic pain may be decreased by preservation of inguinal nerves in open hernia repair.

Introduction:

A review by Poobalan *et al*¹ of studies of inguinal hernia repair between 1987 and 2000 showed the incidence of chronic postoperative pain to be up to 53 per cent (range 0-53 per cent), making it the most frequent complication after surgery. The commonest types of chronic postoperative pain are somatic and neuropathic²⁻⁴. Causalgia syndromes affecting all three inguinal nerves (ilioinguinal and iliohypogastric nerves and the genital branch of the genitofemoral nerve) have been described. There is no consensus on whether or not to identify and subsequently divide or preserve these three nerves together, or separately, during surgery⁵. Lichtenstein and his successor Amid^{6,7} recommend preservation of all three nerves, whereas Wantz⁸ recommends intentional severance based on the concept of 'no nerve, no pain'. This review evaluates and influence of peroperative inguinal nerve identification and subsequent division or preservation on the incidence of chronic postoperative pain.

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Methods

Studies on the effect of peroperative inguinal nerve identification and subsequent division or preservation were included if they contained data on pain lasting longer than 3 months after operation⁹. Randomized, prospective and retrospective cohort studies were included. Study quality was assessed according to a number of variables, such as the quality of methodological reporting, whether studies were randomized, non-randomized, prospective or retrospective, method of randomization and allocation concealment, blinding of outcome assessors, attempts made to minimize bias, sample sizes and ability to measure 'true effect'. The following data were abstracted: type of study, number of patients, baseline characteristics, type of repair, peroperative nerve treatment, follow-up period, incidence of chronic pain and type of assessment.

Results:

Thirteen articles on the influence of inguinal nerve management were identified, of which one letter to the editor, one editorial and one comment were excluded¹⁶⁻¹⁸. Two studies that investigated the influence of iliohypogastric and ilioinguinal nerve

division in or group were excluded as there were no comparable groups in which these nerves were preserved¹⁹⁻²⁰. Another study investigating the influence of ilioinguinal division compared with preservation was excluded as not all the required data were reported²¹.

Of these seven studies, four investigated the influence of ilioinguinal nerve division compared with ilioinguinal nerve preservation¹³⁻¹⁵ including the three randomized trials. In addition, two other studies compared the influence of no inguinal nerve identification with identification and preservation of all inguinal nerves²⁰⁻²¹ Finally, one study compared the influence of no identification with identification subsequent pragmatic facultative division of the genital branch of the genitofemoral nerve¹⁸.

Table-I

Pain after ilioinguinal nerve division or preservation.

Reference	No. of Patients	Pain at 6 months (%)
Ilioinguinal nerve		
Identification & Division		
RCT		
Ravichandran et al. ¹⁰	20	5+
Picchio et al. ¹¹	358	34+
Mui et al. ¹²	50	8+
Cohort		
Dittrick et al. ¹⁹	65	3
Ilioinguinal nerve		
Identification & Preservation		
Ravichandran et al. ¹⁰	20	5+
Picchio et al. ¹¹	354	37
Mui et al. ¹²	49	29+
Cohort		
Dittrick et al. ¹⁹	23	26

All four studies investigating the influence of ilioinguinal nerve division or preservation reported the incidence of chronic pain at 6 months after surgery. The three randomized studies, on which the calculated pooled mean percentage of patients with chronic pain was based, reported results of

851 procedures (428 with ilioinguinal division and 423 after ilioinguinal nerve preservation) (Table-I). No significant difference was found in the pooled mean percentage of patients with chronic pain after identification and subsequent division of the ilioinguinal nerve or identification and subsequent preservation of the ilioinguinal nerve (Table-I). Both studies in which the influence of identification and preservation of all nerves was compared with no identification at all reported a significant difference in chronic postoperative pain in favour of identification (Table-II)²⁰⁻²¹.

Table-II

Pain after no identification of any nerve or identification and preservation of all nerves.

Reference	No. of Patients	Pain at 6 months (%)
No identification of any nerve		
Izard et al. ²⁰	297	3.7+
Alfieri et al. ²¹	189	4.7+
Identification all nerve & preservation		
Izard et al. ²⁰	614	1.6+
Alfieri et al. ²¹	310	0+

Discussion:

Chronic pain may be somatic, neuropathic or visceral in origin. Cunningham et al.³ reported that the commonest type of chronic pain after 'surgery was of somatic origin, whereas Poobalan and colleagues² and Kehlet and co-workers⁴ believe it to be predominantly neuropathic in character. Neurectomy and mesh or staple removal as a treatment for chronic pain after hernia repair has yielded variable results²¹.

The present study has shown that the incidence of chronic pain is significantly less after identification of all three inguinal nerves than after no identification at all in both of two cohort studies (Table-II). No pooled mean was calculated from these studies as the type of operation differed between them (McVay,

Lichtenstein hernia repair and Trabucco's technique). Studies investigating the influence of division and preservation of the ilioinguinal nerve are conflicting. Two randomized studies found no significant difference with respect to the incidence of chronic pain¹³⁻¹⁴, but a further randomized trial and one retrospective cohort study suggested a significant difference in favour of division¹⁵⁻¹⁹.

Pain assessment in the three studies was limited with respect to the following factors that were not recorded current pain medication, nerve block to determine neuropathic character and quantitative sensory testing thresholds. However, light touch and pain sensitivity were assessed by an observer in the studies by Picchio et al.¹¹ and Ravichandran et al.¹⁰. Mui et al.¹² assessed skin sensitivity by Semmes-Weinstein monofilament testing.

As appropriate data have not been reported, this review could not assess the incidence of numbness after nerve division or problems deriving from the division of motor part of the genital branch of the genitofemoral nerve. One way to prevent nerve scarring in the operative field is to resect the nerve under tension so that it retracts behind the peritoneum; another is to implant the ligated proximal end of the ilioinguinal and iliohypogastric nerves within the fibres of the internal oblique muscle to prevent the ends from adhering to the inguinal ligament and/or external oblique aponeurosis. These different types of treatment have been investigated in situations of therapeutic neurectomy after inguinal nerve entrapment but not during primary hernia repair.

In conclusion, the available data suggest that the inguinal nerves should be identified during open repair of hernia. In terms of outcome, there is little difference between dividing or preserving the ilioinguinal nerve. Pragmatic division of the genital branch of the genitofemoral nerve seems beneficial.

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