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Sensory disturbances and neuropathic pain after inguinal hernia surgery

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ABSTRACT

Objectives: The aim of this study was to explore how the handling of nerves affects the risk for developing sensory disturbances (SDs) following groin hernia surgery.
Patients and methods: All patients 18 years or older undergoing surgery for inguinal hernia at Mora Hospital, Sweden, during an eight-month period in 2006, were eligible for inclusion. The surgical procedure was recorded prospectively according to a standardised protocol. One year postoperatively all patients were requested to answer the Inguinal Pain Questionnaire as well as a set of 18 sensory and affective pain descriptors. They were also invited to clinical examination including sensory testing.
Results: Of the 157 hernia repairs in Mora during the period of study, 128 repairs in 116 patients, were registered prospectively according to the study protocol. Laparoscopic total extraperitoneal (TEP) repair was performed in 36 (28%) of the patients. Ninety-two (79%) patients, including five patients operated bilaterally, underwent postoperative examination. SDs were found in 33 (34%) of the groins examined. No descriptor was found that significantly predicted the presence of altered examination findings. No significant association between the intraoperative handling of nerves and SD was seen. In the TEP-group, no SDs were seen. Infiltration of local anaesthetic agents and blockade of the ilioinguinal nerve prior to surgery were found to be significantly associated with SD more than 2 cm away from the scar (both $p < 0.05$). The presence of SD was not associated with significant pain.
Conclusions: SDs are common after open hernia surgery, but are not associated with persistent postoperative pain.

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1. Introduction

Sensory disturbance (SD) due to nerve trauma is a common adverse outcome after inguinal hernia surgery [1–3]. Nerve lesions may also lead to persistent neuropathic pain, although this is not always the main pathogenesis behind persistent postoperative pain. A causal relationship between nerve lesion and persistent pain is often taken for granted, even though clinical signs of nerve lesion are not consistently present alongside pain. Numbness in the groin may be present even in the absence of pain [4,1] and persistent pain after groin hernia repair may be present in the absence of signs of nerve lesion [2]. The development of persistent postoperative pain is complex and involves several mechanisms [5] of which nerve entrapment or transection are two of several causes. The pain may also be caused by nociceptive stimuli such as chronic inflammation due to foreign material reaction to the mesh, tension in the repair or mechanical tissue compression from a folded mesh.

It has been suggested that verbal descriptors of pain such as those used in the McGill Pain Questionnaire [6] may enable identification of patients with neuropathic pain [7]. The value of these descriptors as an instrument to discriminate between pain of different origins, however, depends on the accuracy of the pain language. The pathogenesis of pain may be determined by neurophysiological examination or quantitative sensory testing [8,9], but the predictive ability of verbal pain descriptors has not been fully evaluated.

The aim of the present study on a population-based cohort after hernia surgery was to determine the prevalence of SD after hernia repair, to assess whether questionnaire descriptors can be used to identify patients with neuropathic pain, and to explore how the handling of nerves intraoperatively, and the use of local anaesthesia affect the risk for developing SD.

2. Patients and methods

Patients aged 18 years or older undergoing surgery for inguinal hernia at Mora Hospital, Sweden, between January 30th and August 21st 2006, were included in the study. Laparoscopic TEP operation was performed for bilateral or recurrent hernias and the Lichtenstein procedure for primary unilateral hernia, according to local routines.

Reasons for surgery were for most patients the generally accepted indications, i.e. pain or attacks of incarceration. No attempts were made to distinguish between nociceptive and neuropathic pain or to relive the pain by local anaesthesia before surgery.

The surgical procedure was recorded prospectively according to a standardised protocol, where the operating surgeon stated whether the iliohypogastric nerve, ilioinguinal nerve and genitofemoral nerve was identified and/or divided. The decision to divide or preserve the nerve was at the discretion of the surgeon, based on the individual case. Meshes were fixated by means of non-absorbable sutures in open surgery, and with fibrin glue in laparoscopic procedures. Use of local anaesthesia, administered by the surgeon, as infiltration or ilioinguinal block before, or at the end of surgery, was recorded.

One year postoperatively all patients were contacted by mail and requested to answer the Inguinal Pain Questionnaire (IPQ) prior to the follow-up visit. The questionnaire also included a set of 18 sensory and affective pain descriptors (Table 2), previously suggested for use in characterising pain after hernia surgery [10]. The IPQ has been validated in a similar cohort [11] Two of the items in IPQ are questions about level of pain, rated on a seven-level scale based on its impact on behaviour and daily activities ranging from “no pain” to “Pain present, prompt medical advice sought”. The pain descriptors were answered “yes” or “no”, with no limitation of number of positive answers.

All patients, regardless of questionnaire outcome, were invited to undergo a neurological evaluation of touch sensitivity, pinprick and temperature in the groin region and adjacent areas including the upper and medial aspect of the thigh and the lateral aspect of the scrotum. The contralateral groin was not examined.

Basic clinical equipment was used in order to make the methods easily reproducible in every day practice. A cotton coated ear stick lightly touching the skin was used for testing touch sensitivity. The ability to discriminate between the sharp and blunt end of a needle was used for pinpricking. Warm and cold lumps of metal were used for temperature testing. All tests were interpreted as normal or not without any grading. Hyper- as well as hyposensitivity to any tested modality was interpreted as a positive finding. In order to evaluate inter-observer agreement, the examination was performed independently by two surgeons in 36 cases. Pain in combination with impaired or altered sensory nerve function was interpreted as being neuropathic, whereas pain in combination with normal examination findings was interpreted as nociceptive. Since the anatomic variations make it difficult to link a specific nerve lesion with the distribution of SD [12], no attempts were made to identify which nerves where affected at the examination. Sensory function before surgery was not tested.

The study was approved bye the regional ethical review board (Uppsala, Dnr 2007/101).

2.1. Statistics

For analysis of ordinal data such as pain scale ratings comparing patients with and without altered sensory findings the Mann–Whitney *U*-test was used. Chi-square and Fisher’s exact test was used for testing categorical data. The association between the response to the pain descriptors and the presence of sensory disturbance was also tested chi-square test in patients stating presence of pain, with no a priori hypothesis of which descriptor may predict the presence of neuropathic pain. The inter-observer agreement between the two independent assessments of SD was tested with Kappa statistics [13]. *p*-Values less than 0.05 were considered significant.

3. Results

During the study period, a total of 157 hernia repairs were performed in Mora. Of these, 128 repairs, including 12 bilateral repairs, were registered prospectively according to the study protocol and responded to the questionnaire. There were thus 116 patients, including 10 repairs in 8 women, eligible for inclusion in the study. All of these patients were invited to follow-up examination. Mean age was 60 years, standard deviation 15 years. Thirty-six (28%) of the repairs were performed as laparoscopic total extraperitoneal (TEP) inguinal hernia repair. Ninety-two (79%) patients, including five patients operated bilaterally, underwent postoperative neurological examination.

SDs were found in 33 (34%) of the examinations. In 20 groins (21%) the sensory disturbances extended more than 2 cm away from the scar (Table 1). No descriptor was found that significantly predicted the presence of neuropathic pain (Table 2). No significant association between the intraoperative handling of nerves and SD was seen, although a tendency towards higher prevalence of SD was seen if the ilioinguinal nerve was transected ($p = 0.097$) (Table 3). No SD extending more than 2 cm away from the scar after previous inguinal incision was seen in the TEP-group. Local infiltration of local anaesthetic agent and blockade of the ilioinguinal nerve prior to surgery were found to be significantly associated with SD more than 2 cm away from the scar (both $p < 0.05$). The presence of SD was not significantly associated with pain (Table 4).