INTRODUCTION

This supplement is part of the thesis of Maarten Loos on ‘the surgical management of chronic inguinal pain syndromes’ (University of Maastricht, September 29th 2011).

‘Routine’ operations such as inguinal herniorrhaphy and Pfannenstiel incisions for caesarean deliveries may inflict patients with chronic pain that is likely related to the interference with nerve structures located in the lower abdominal and inguinal area. Knowledge on the diagnostic and therapeutic options is limited. The aim of this thesis was to study the management of chronic pain syndromes after inguinal hernia repair and Pfannenstiel incisions in general patient populations.

Prevalence and risk factors
An initial questionnaire study investigated the incidence of chronic pain among more than 2000 inguinal hernia repair patients. Over 40% of the patients reported some degree of pain (moderate pain 9%, severe 2%). One fifth felt functionally impaired in their work or leisure activities and almost one-fourth of the pain patients reported inguinal numbness. Other pain associated variables were age and recurrent hernia.
repair. This first study clearly indicated that patients scheduled for routine inguinal hernia repair should be counselled preoperatively on the risk of chronic post-operative pain.

A second study described a modified questionnaire interviewing a MMC cohort of women (n=866) with a history of Pfannenstiel incision for caesarean delivery or abdominal hysterectomy. After a 2 year follow-up, one third experienced some form of chronic pain at the incision site. Moderate or severe pain was reported by 7%, and 9% of the women was impaired in daily activities. Nerve entrapment was present in over half of the examined patients reporting moderate to severe pain. This study demonstrated that chronic pain due to nerve entrapment is common following a routine Pfannenstiel incision.

**Diagnostic approach**

Various pain tools are available in pain research. A third study compared two commonly used tests (Visual Analogue Scale (VAS, 0-100mm) and 4-point Verbal Rating Scale (VRS) for scale failure, sensitivity and interpretability. A questionnaire identified the pain intensity level in a cohort of patients that previously underwent inguinal herniorrhaphy. Scale failure (one or both tests not completed correctly) was observed five times more frequently in VAS tests compared to VRS. Advanced age was a significant risk factor for scale failure. VAS categories which concurred the most with VRS scores were: 0-8 mm = no pain, 9-32 mm = mild, 33-71 mm = moderate, >71 mm = severe pain. VAS scores grouped per VRS category showed considerable overlap. The VRS was superior in sensitivity and interpretability. It was concluded that the VRS should be favoured over the VAS in postherniorrhaphy pain assessment.

**A novel classification**

A universally accepted classification for postherniorrhaphy pain is lacking. A fourth study studied 148 patients with moderate to severe postherniorrhaphy pain complaints using an interview and a physical examination. Three separate groups of diagnoses were identified. Group I was suffering from neuropathic pain (50%) indicating inguinal nerve damage. Group II harboured non-neuropathic pain (25%) due to various diagnoses such as periostitis and recurrent hernia. Group III was characterized by a tender spermatic cord and/or a tight feeling in the lower abdomen (‘funiculodynia’, 25%). Chronic pain following elective hernia repair apparently is diverse in etiology, but our classification may contribute to the development of tailored treatment regimens.

**Surgical management**

Our treatment approach of neuropathic pain after inguinal hernia repair and Pfannenstiel incisions offers nerve blocks and operative neurectomy. First, treatment results of
54 postherniorrhaphy neuropathic pain patients who underwent a neurectomy (dissection and removal of affected nerve) in our hospital were analyzed. About half claimed to be pain-free or almost pain-free, a quarter experienced some pain reduction but still experienced pain at a regular basis, whereas the remaining quarter did not benefit from the neurectomy. Sexual intercourse-related pain and dysejaculation disorders responded favourably to neurectomy in two-thirds of the involved patients. This retrospective cohort study demonstrated that a surgical neurectomy provides reasonably good long-term pain relief for postherniorrhaphy groin neuralgia in the majority of patients.

A randomized controlled trial (‘GroinPain Trial’) was constructed to identify the optimal treatment modality in patients with postherniorrhaphy pain. Adult patients with chronic postherniorrhaphy inguinal pain (> 3 months) caused by inguinal nerve entrapment with a temporary, but significant pain reduction after a lidocain nerve block are eligible for randomization. They either receive repetitive local nerve blocks with lidocain, corticosteroids and hyaluronic acid, or a ‘tailored’ surgical neurectomy. Patient enrollment started in February 2006 and is expected to end in June 2011. Results of this prospective randomized controlled trial are expected shortly.

Patients treated for neuropathic pain after a Pfannenstiel incision were retrospectively investigated. Twenty-seven women had either received a neurectomy and/ or only local nerve blocks. A single diagnostic nerve block provided long-term pain relief in five patients. Satisfaction in the remaining 22 women undergoing neurectomy was good to excellent in 73%, moderate in 14%, and poor in 13%. Successful treatment improved sexual intercourse-related pain in most females. Co-morbidities (endometriosis, lumbosacral radicular syndrome) and earlier pain treatment were identified as risk factors for surgical failure. This study demonstrated that peripheral nerve blocking provides long-term pain reduction in some individuals with post-Pfannenstiel neuralgia. An iliohypogastric or ilioinguinal nerve neurectomy is a safe and effective procedure in most remaining patients.

**Occupational disability**

Routine inguinal hernia repair results in occupational disability in 1-2% of the patients. However, only 4 of 23 studies on neurectomy for inguinal neuralgia reported on occupational disability as a secondary outcome measure. In our patient registry some 56 to 100% of the patients could resume their occupational obligations after pain treatment. Moreover, effective pain treatment, such as our ‘tailored neurectomy’ is calculated to save a minimum of €1.8 million of workers’ compensational costs in The Netherlands yearly. Tailored neurectomy apparently is an effective treatment for occupational disability due to postherniorrhaphy inguinal neuralgia in patients. A successful neurectomy greatly reduces workers’ compensational costs and may have substantial financial consequences worldwide.
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