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Original article

Chronic pain after carpal tunnel surgery: Epidemiology and associated factors

Douleurs chroniques après chirurgie du canal carpien : épidémiologie et facteurs associés

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ABSTRACT

Background. – Chronic postoperative pain (CPOP) has been assessed after major orthopedic surgeries but not after carpal tunnel surgery (CTS). This study aimed at describing the evolution of nocturnal and diurnal pains during the year following CTS, and at looking for factors associated with CPOP.
Methods. – Cohort of adult outpatients operated by one single surgeon, under regional anaesthesia (RA). Patients were questioned in the recovery room, and phoned 3 days and 12 months later. A multivariate analysis tested the association between CPOP and preoperative demographics, regional anaesthesia protocol, pain during RA, surgery and the first 3 postoperative days, postoperative complications.
Results. – Between November 2006 and June 2010, 324 of 389 patients could be included. The nocturnal and diurnal pains disappeared on the evening of the procedure in 55% (180/324) and 50% (163/324) of patients respectively. At one year, 12% of patients (40/324) complained of pain which characteristic was similar to the preoperative one, and 22% (71/324) complained of a new pain (different from the preoperative one), which was therefore considered as CPOP. CPOP was associated with a decreased functional score (QuickDASH). After multivariate analysis, CPOP was associated with postoperative pain from D0 to D3 ($p = 0.02$), minor postoperative complications ($p < 0.001$) and absence of hypnotic approach during surgery ($p = 0.01$).
Conclusion. – One year after CTS, 22% of patients have CPOP. This incidence is similar to the one observed after major surgeries. This study suggests for the first time that a hypnotic approach during the surgical procedure might decrease the CPOP incidence.

Mots clés:
Douleur chronique postopératoire
Chirurgie du canal carpien
Anesthésie locorégionale
Hypnose

RÉSUMÉ

Introduction. – L'incidence des douleurs chroniques postopératoires (DCPO) a été évaluée après diverses chirurgies orthopédiques lourdes, mais pas après des chirurgies moins invasives comme la libération du canal carpien (LCC). Le but de cette étude était de décrire l'évolution des douleurs nocturnes et diurnes durant l'année suivant une LCC et de rechercher d'éventuels facteurs associés à la survenue de DCPO.
Patients et méthodes. – Cohorte de patients adultes opérés en ambulatoire par un même chirurgien, sous anesthésie locorégionale (ALR). Les patients étaient interrogés en salle de réveil, et rappelés par téléphone trois jours puis 12 mois plus tard. Une analyse multivariée a testé l'association des DCPO à diverses données démographiques préopératoires, au protocole d'ALR, aux douleurs ressenties durant l'ALR, la chirurgie et les trois premiers jours postopératoires, et à la survenue de complications.
Résultats. – Entre novembre 2006 et juin 2010, 324 des 389 patients incluables ont été suivis. Les douleurs nocturnes et diurnes ont disparu le soir de l'intervention dans 55 % (180/324) et 50 % (163/324) des patients respectivement. À un an, 12 % des patients (40/324) mentionnaient des douleurs ayant des caractéristiques similaires à celles présentes en préopératoire, et 22 % (71/324) décrivaient de nouvelles douleurs (différentes des douleurs préopératoires), qui ont été considérées comme des DCPO. Les DCPO étaient associées à un moindre score fonctionnel (QuickDASH). Après analyse multivariée, les DCPO étaient associées à la survenue de douleurs postopératoires précoces ($p = 0,02$),

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de complications bénignes ($p < 0{,}001$), et à l'absence d'approche hypnotique durant l'intervention ($p = 0{,}01$).
Conclusion. – Un an après LCC, 22 % des patients ont des DCPO. Cette incidence est similaire à celle observée après des chirurgies plus lourdes. Cette étude suggère pour la première fois qu'une approche hypnotique durant l'intervention pourrait limiter la survenue de DCPO.

1. Introduction

The incidence of chronic postoperative pain (CPOP) after major surgery is estimated at between 20 and 50%[1–3]. After major orthopaedic surgery, the incidence varies between 8 and 28% for hip replacement [4,5] and is 35% for knee replacement [6]. After knee arthroscopy, the incidence of CPOP is estimated at 30% [7]. At present, there are no studies dealing with other forms of minor orthopaedic surgery, like carpal tunnel surgery (CTS).

Painful upper limb syndromes, such as carpal tunnel syndrome, constitute the main cause of disability before age 45 [8]. Its estimated annual incidence is 300 per 100,000 [9] among the general population. In France, 80,000 CTS are performed each year [10]. Despite an abundant literature on CTS, the CPOP incidence after such surgery is still unknown, as are the factors contributing to CPOP development.

The purpose of this study was therefore to describe nocturnal and diurnal pains during the year following isolated open CTS, and to research the potential risk factors associated with CPOP occurrence.

2. Methods

2.1. Patients

Monocentric prospective study on adult outpatients having undergone scheduled open-cut CTS under regional anaesthesia (RA). Carpal tunnel syndrome was diagnosed on the basis of clinical and electromyographic proof. The operations were performed by a single surgeon specialist in hand surgery [7,10–15]. RA was administered by one of the seven anaesthesiologists who have been practicing orthopaedics on a daily basis for more than 4 years. The choice of RA technique was left up to the routine practice of each anaesthesiologist. All patients were operated on in the same outpatient unit.

The non-inclusion criteria included non-isolated CTS (another surgery performed at the same time) and repeat CTS.

As this observational study did not involve any modifications to the routine care of patients receiving this type of surgery, no application was required from the local ethic committee in accordance with French legislation. However, the patient's consent was always requested by telephone, before the questionnaire.

2.2. Preoperative anaesthetic treatment

The patients were not premedicated. Intravenous sedation with midazolam 1 mg and/or sufentanil 5 μg for achieving RA was left to the discretion of the anaesthesiologist attending the patient.

RA consisted in median and ulnar nerve blocks, sometimes associated with the musculocutaneous nerve block, according to the customary practice of the anaesthesiologist. RA was performed at the armpit under ultrasound guidance [16], or at the humeral canal [17] or at the wrist [18] using nerve stimulation. Mepivacaine 1.5% (Carbocaine®, AstraZeneca, Rueil-Malmaison, France) was used in all cases (15 to 20 mL).

During the preoperative and the peroperative period, each patient was accompanied by a specialized nurse. Among our staff, two of five nurses used to communicate with the patients by using a hypnotic approach. In this way, they paid attention to use only positive sentences, and to focus the attention of the patient on pleasant contexts like recent holydays or hobbies. They never induced hypnotic trance *per se*.

2.3. Surgical treatment

A brachial pneumatic tourniquet was inflated to 250 mmHg. The anterior carpal annular ligament was opened with a scalpel under visual guidance.

The skin was closed in a single phase, without drainage, with separate stitches using non-absorbable sutures.

2.4. Postoperative care

Patients were given a meal and one gram of paracetamol by oral administration. They were discharged 3 hours later along with a prescription for paracetamol and vitamin C. A wrist splint was fitted and left in place for 15 days. Patients were phoned 3 days later for a routine assessment of postoperative pain, nausea, vomiting, or any other complication.

2.5. Protocol

In the postanaesthetic care unit, a questionnaire was conducted by a nurse who was not involved in the perioperative care. It assessed the level of pain experienced during RA, during inflation of the tourniquet and at the surgical site during the operation (using a numerical rating scale [NRS] from 0 = no pain to 10 = unbearable pain).

Additional data were collected from clinical records: demographic data (operation date, age, gender, weight, height, dominant and operated sides, active smoking status, chronic use of anxiolytic and/or antidepressant drugs), intraoperative data (intravenous sedation with midazolam and/or sufentanil, type of RA, tourniquet duration, presence of a nurse anaesthetist in the operating room who was trained in patient hypnosis) and pain at home between D0 and D3, and at D3 (presence or not of pain at the surgical site).

At one year (± 3 months), the patients were phoned and invited to complete a questionnaire (Appendix 1) dealing with:

- a self-evaluation of nocturnal and diurnal pain before surgery and on the day of the questionnaire, on a NRS;
- the time elapsed between surgery and the nocturnal and diurnal pain disappearance, any recurrence of pain, noting as appropriate the length of time before its recurrence, and its characteristics (nocturnal/diurnal, location, type), queries about any postoperative complications, general satisfaction with respect to the CTS, between 0 (definitely unsatisfied) and 10 (completely satisfied)

A written questionnaire were therefore mailed to complement the telephone survey. The quality-of-life questionnaire (Quick Dash [21]) is a self-assessment of the functional capabilities of the upper limb. Comprised of 11 items graded from 1 to 5, it is used to determine a disability score between 0 and 100. The higher the score is, the greater the disability [19–21]. No questionnaire specific to the neuropathic component of pain was performed at