'Why me?' The problem of chronic pain after surgery

Patricia Lavand'homme

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Abstract

Chronic postsurgical pain (CPSP) has become a health priority and is scheduled to be included in the upcoming version of the International Classification of Diseases, 11th Revision (ICD-11). Recent studies on CPSP show unchanged prevalence despite progress made in fundamental research about underlying pathophysiological mechanisms. Nevertheless, clinical research has allowed better understanding of some CPSP aspects such as the development of neuropathic CPSP. Actually, some improvements are ongoing such as a refined definition and the assessment of CPSP in vulnerable populations, for example, paediatric patients. Pain after surgery, its resolution or its transition to CPSP is a dynamic process that reinforces the necessity of longitudinal assessment and management. In other words, CPSP can be called 'perioperative medicine'.

Keywords

Chronic pain, pain, postoperative, pain management, pain measurement

Introduction

This year, the *International Association for the Study of Pain* (IASP) sponsors the 'Global Year against Pain after Surgery'. The main goal of this initiative is to encourage improved management of pain after surgery and to raise awareness about persistent postsurgical pain. Several fact sheets have been posted on IASP website, one of them specifically dedicated to 'chronic postsurgical pain' (CPSP) (Fact sheet No. 4. Chronic Postsurgical Pain: Definition, Impact, and Prevention. P. Lavand'homme and E. Pogatzki-Zahn).

More than 230 million people undergo surgery each year, and the global volume of surgery is still increasing worldwide.¹ However, contrasting with progress made in fundamental research, the clinical management of acute postoperative pain remains suboptimal.² Such evidence implies major consequences because although no causal association might exist, severe poorly relieved acute postoperative pain stands as a major risk factor for the development of persistent pain after surgery.^{3,4}

Here also, we are forced to acknowledge that CPSP prevalence has remained unchanged over the past years since the first definition proposed by Macrae.⁵ In 2008,

an editorial⁶ dedicated to acute postoperative pain summarized the situation as follows: 'CPSP develops in 1 of 10 surgical patients and becomes an intolerable pain condition after 1 of every 100 operations'. Since then, several prospective studies have found a similar prevalence despite significant evolution in surgical techniques.⁷ A recent multicentre observational study about 'chronic postsurgical pain in Europe' reported a 12-month incidence of 11.8% moderate CPSP and 2.2% severe CPSP (i.e. Numeric Rating Scale (NRS) >6, on a scale from 0 to 10).⁴ Chronic pain, whatever its origin, is a pressing medical and socioeconomic problem.⁸ Not surprisingly, CPSP has become a health

Université catholique de Louvain – Cliniques Universitaires Saint-Luc, Brussels, Belgium

Corresponding author:

Patricia Lavand'homme, Université catholique de Louvain – Cliniques Universitaires Saint-Luc, Avenue Hippocrate 10, 1200 Brussels, Belgium.
Email: patricia.lavandhomme@uclouvain.be

priority and is scheduled to be included in the upcoming version of the *International Classification of Diseases*, 11th Revision (ICD-11) which results from the joint efforts of World Health Organization (WHO) and IASP.⁹ The inclusion of CPSP in ICD-11 is expected to increase the problem recognition and to further promote interdisciplinary research.

CPSP: unchanged prevalence but ongoing progress in the field

Besides the determination of CPSP prevalence, the multicentre study from Fletcher et al.⁴ has depicted the situation and has pointed out important findings:

- CPSP generally decreases with time: from patients presenting with CPSP at 6 months, 56% were pain free at 12 months.
- Conversely, CPSP is not always a continuation of acute postoperative pain but can develop after an asymptomatic period: 3% of patients with no pain at 6 months mentioned CPSP when questioned at 12 months after surgery.
- Signs of neuropathic pain were found in 35–57% of CPSP patients, and these patients reported higher pain intensity and poorer quality of life.

The current observations support the update of the working CPSP definition initially proposed by Macrae⁵ (Table 1). The later refined definition according to Werner and Kongsgaard's¹⁰ proposals will be the one included in the upcoming ICD-11 version.⁹

As with many other studies in the field, the observational study from Fletcher et al.⁴ also identified risk factors for the development of CPSP, such as preoperative pain and the percentage of time in severe pain during the first 24 hours after surgery. These factors are also part of a prospective risk-factor index³ which identified five key predictors: emotional overload/overstrain, preoperative pain at the operative site, other chronic preoperative pain (e.g. headache, fibromyalgia, backache), acute postoperative pain and comorbid stress symptoms such as anxiety and disturbed sleep (including the intake of medications to treat those symptoms). It is worth noting here that despite the hopes and promises of genetics which unveiled several links between gene polymorphisms and sensitivity to pain, clinical risk factors remain the best available predictors of CPSP. In a subset of 1000 patients, six clinical factors predicted 73% of the CPSP which developed, while no evidence resulted for genetic predisposition using 90 genetic markers.¹¹ A similar conclusion was made by Martinez et al.¹² regarding the development of neuropathic CPSP which was best predicted by clinical markers than histological or biochemical ones.

Table 1. Updated^a definition of chronic postsurgical pain (CPSP).

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- Pain developed after a surgical procedure *or increased in intensity after the surgical procedure*
 - Pain should be of at least 3 months' duration with a *significant negative effect on the quality of life*
 - Pain is a continuation of acute postoperative pain *or may develop after an asymptomatic period*
 - Pain is localized to the surgical field *or to a referred area* [e.g. innervation territory, referred dermatome for visceral surgery]
 - Other possible causes for the pain have been excluded [e.g. infection, cancer recurrence]
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^aItalic characters concern the modifications proposed and added to the initial definition (from Macrae,⁵ and Werner and Kongsgaard¹⁰). The current definition of CPSP has been accepted by the International Association for the Study of Pain (IASP) Task Force on Chronic Pain and will be included in International Classification of Diseases, 11th Revision (ICD-11).⁹

Postoperative pain stands as an important determinant of the development of CPSP, particularly the duration of severe pain after surgery. Today, around 30% of patients endure severe pain (NRS >6) during the first 24 hours after surgery, even after minor procedures.² The amount of time spent in severe unrelieved pain rather than, for example, a single peak pain intensity rating is associated with an increased risk of CPSP.⁴ Postoperative pain is a dynamic process, and having a wider view of postoperative pain evolution certainly does matter. The development of 'pain trajectories' should allow us to characterize an individual's postoperative pain and thereby identify abnormal acute pain resolution.¹³ Looking at the pain trajectory pattern and specifically the slope of the trajectory, that is, pain resolution, during the first week after surgery, 25% of the patients show no pain resolution (flat slope) and 12% of the patients worsen their postoperative pain (increased slope). After total knee replacement, the latter were still in severe pain at 3 months after surgery with their CPSP, including a neuropathic component.¹⁴ The control of severe acute pain after surgery requires a correct assessment of the type of pain with the aim of providing accurate treatment. Recent observations support this assertion. First, early acute postsurgical neuropathic pain, a diagnosis often neglected, significantly increases the risk of neuropathic CPSP.¹⁵ Second, after abdominal surgery, the visceral component of the pain might be the one to target. Indeed, the risk of chronic pain after laparoscopic cholecystectomy seems significantly related to the visceral pain response during the first week after surgery.¹⁶

Finally, while CPSP has been mostly studied after in-hospital procedures performed in adult patients, recent interest about its prevalence in different populations is growing. Outpatient surgery differs in several

Figure 1. From acute to chronic pain after surgery: risk factors.

aspects, for example, less tissue damage, different anaesthetic techniques, selected patients and also less optimal acute pain control. However, the prevalence and intensity of CPSP do not seem to differ from those found in hospitalized patients.^{17,18} Assessment of CPSP in vulnerable populations is also ongoing, specifically in children. The literature on the topic is sparse,¹⁹ despite the potential impact of pain occurring during the development period on the occurrence of pain persistence in adulthood. A recent prospective study including 300 children aged 6–18 years found a prevalence of 10.9% CPSP with a neuropathic component in 60% of the cases.²⁰ Two main risk factors for CPSP in children were the existence of recent pain before surgery and the severity of acute postoperative pain in the first 24 hours.

Future agenda: focus on the transition from acute postoperative pain to CPSP

The article from Chapman and Vierck⁸ provides readers with an excellent and up-to-date summary regarding basic neurophysiological mechanisms (in the periphery, spinal cord and brain) possibly involved in the chronification of surgical pain. Once again, as previously stated for acute pain, progress in basic research has not led to effective preventive strategies in clinical setting. Clinical risk-predictive instruments lack specificity or sensitivity and should be best viewed as broad guides. It is mandatory to keep in mind that pain, its resolution or its chronification is a dynamic process.^{7,8} Therefore, not only pre- but also perioperative and postoperative patient follow-up deserves all our attention. From this perspective, some directive lines emerge now as opportunities to interfere with CPSP development^{7,8} (Figure 1).

Preoperative pain, at the site of surgery and elsewhere, is a well-known risk factor of CPSP. More, pre-operative use of opioids not only worsens acute postoperative pain but also increases the risk of CPSP with a relative risk (RR) of 2.0 (95% confidence interval, 1.2–3.3)²¹ and is usually associated with a poorer outcome after orthopaedic procedures.²² Patients who successfully decrease their use of opioids before surgery (50% weaning of opioid dose) demonstrate substantially improved clinical outcomes, comparable to patients who do not take opioids, after joint arthroplasty.²³ As previously mentioned, a neuropathic component and/or origin is found in 35% and more of CPSP. Early diagnosis and accurate treatment might contribute to reduce the prevalence or at least the intensity of neuropathic CPSP.^{15,24} However, adequate tools and methodology for identifying acute neuropathic pain are missing, and existing tools like DN4 (Douleur Neuropathique 4) questionnaire have been validated only under chronic pain conditions. Also, the time course of neuropathic CPSP is still largely unknown. In some cases, diagnosis can be made within the first 48 hours after surgery as Beloeil et al.¹⁵ did, who identified 12.9% neuropathic pain among acute postoperative pain patients. In other cases, a delayed onset was found (8% neuropathic pain in the immediate postoperative period vs 22% at 3 months after thoracic surgery).²⁵ Such observations reinforce the necessity of longitudinal assessment of postsurgical pain, including the sub-acute pain period which actually remains a 'grey zone'.^{7,8}

Finally, it is important to come back to the IASP definition of pain and to remember that chronic post-surgical 'pain' should not be viewed as an isolated element but rather should be assessed as a component of

the patient's quality of life. CPSP is one of the various patient-reported outcomes (PROs).

Conclusion

Recent studies on CPSP indicate unchanged prevalence despite progress made in fundamental research about underlying pathophysiological mechanisms. Nevertheless, clinical research has allowed better understanding of some aspects of CPSP. Consequently, some improvements are ongoing like a refined CPSP definition which will be included in the new ICD-11 version. Pain after surgery, its resolution or its transition to CPSP is a dynamic process that reinforces the necessity of longitudinal assessment and management. In other words, CPSP can be called 'perioperative medicine'.

Conflict of interest

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