



Predictors of persistent acute postoperative pain: an opportunity for preventative medicine to reduce the burden of chronic pain

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Abstract

Chronic pain represents a major public health problem. A major precursor of a chronic pain state is persistent acute postoperative pain. Risk factors of developing persistent acute postoperative pain are identified and preventative strategies for implementation are discussed.

Epidemiological studies have shown that chronic pain represents a major public health problem.¹ The prevalence of chronic pain obtained ranges from 8%–80% due in part to the differences and inconsistencies in the definitions of chronic pain used.¹ The prevalence of pain increases with age.²

In an aging society, chronic pain will increasingly impact on successful aging. The most recent study shows the overall prevalence of chronic pain in Denmark to be 19% (16% for men, 21% for women).¹ Nearer home, chronic pain impacts upon a large proportion of the adult Australian population (17.1% for men, 20 % for women).³

In the only New Zealand study on chronic pain prevalence, of the 1498 adults interviewed, the majority of subjects reported more than one life disrupting experience of pain.⁴ Chronic pain patients are extensive user of healthcare services in the primary and secondary care sector.¹ Apart from the suffering (to the affected individuals and their families) and the quality-of-life issues involved, an economic burden of this size impacts negatively on healthcare costs and on working-age populations due to reduced functionality and work performance.^{1,2,5} Yet politicians and health care providers alike have almost totally ignored this problem, and the general public remains blissfully unaware of its extent.

‘When does acute pain become chronic?’ is an oft-asked question. Persistent acute postoperative (and post-traumatic pain) is pain in the location of the surgery that persists beyond the usual course of an acute injury (surgery, trauma) and is different from that suffered preoperatively. Negative clinical outcomes of inadequately managed acute postoperative pain include extended hospitalisation, compromised prognosis, and higher morbidity and mortality.⁵ Persistent acute postoperative pain becomes a major precursor of a chronic pain state as a result of neuronal plasticity.⁵ But is acute postoperative pain being optimally managed?

A recent survey shows that nearly 80% of patients still experience pain after surgery. Of these patients, 86% had moderate, severe, or extreme pain.⁶ Pain persists after laparoscopic cholecystectomy (13%),⁷ open inguinal hernia repair (30%),⁷ post-thoracotomy (62%),⁷ limb amputation (70%),⁸ postcardiac surgery pain (39%)⁹ and mastectomy (30%).⁷

What is the mechanism for persistent acute postoperative pain? At surgery, noxious stimuli may sensitise central neural structures involved in pain perception (via activation of the N-methyl-D-aspartate receptors) and result in the persistence of pain afterwards.^{10,11} In some patients, the hyperphenomena (primary and secondary hyperalgesia, mechanical allodynia) that are normal in the first days or weeks after surgery, do not regress but persist.¹²

What are the risk factors of developing persistent acute postoperative pain? There is increasing evidence that the site and extent of the surgery are the most important factors determining the intensity and duration of acute postoperative pain.¹³ Thoracic, major limb amputation and spinal surgeries are the most painful procedures.¹⁴ But abdominal, urological and major orthopaedic surgery lead to severe postoperative pain as well.¹⁴

Patients who have the most severe pain or who had consumed the most analgesics during the week after surgery, have a higher risk of having persistent pain after many months.⁷ Another risk factor may be the presence of preoperative pain.¹³ In phantom-limb pain, a major role is assigned to pain occurring before the amputation.¹⁵ Patients with preoperative angina were more likely to report chronic pain following cardiac surgery.⁹ In hernia repairs, preoperative pain is a risk factor for the development of chronic pain.⁷

Other preoperative predictors of postoperative pain include female gender, and younger age.¹³ When roots, nerves, the plexi, and central neural structures are damaged during surgery, post-traumatic neuropathic pain becomes another important contributor to persistent pain. Unrelieved acute postoperative pain is the main risk factor in developing persistent pain.⁷ The single best approach is to prevent it.

Emotion, perception, and past experience all affect an individual's response to noxious stimuli.¹⁶ Firstly, patient attitudes and concerns about postoperative pain need to be addressed preoperatively.¹⁷ Pre-emptive analgesia was assumed to reduce the risk of developing persistent acute pain. Yet a recent systematic review has been negative as to the potential beneficial effect of pre-emptive analgesia on postoperative pain due to poor trial designs and confusion over terminology and definition.¹⁸

Secondly, the least painful surgical approach with acceptable exposure should be chosen.⁷ Tissue trauma during surgery should be minimised. New surgical techniques such as key-hole surgery and the microsurgical approach using operating microscopes have led to 'fast track' surgery with minimal hospital stay and reduced convalescence.¹⁹

Thirdly, the operative procedures associated with the development of severe pain need to be identified. Communication with patients is vital in determining whether measures that are normally used to control pain are failing to provide relief. In 2001, the Joint Commission on the Accreditation of Healthcare Organizations (in the United States) designated pain as the 'fifth vital sign' and incorporated the assessment of pain into its standards of practice to be used.²⁰ Early interventions for patients at risk may beneficially influence long-term outcomes.

Fourthly, in most patients, the use of basic multimodal pharmacological analgesia provides optimal acute perioperative pain relief.¹² Severe dynamic pain (coughing,

moving) may be relieved by well-tailored epidural multimodal analgesia.^{7,12} Early ambulation should also be employed.²¹

Fifthly, as about 60% of surgery is now performed in an ambulatory setting, patients should receive individualised discharge analgesic packages and be followed-up at home.²² Perineural catheters with portable pumps of local anaesthetic infusions are being used successfully at home.²³ Finally, does the patient have preoperative chronic pain? How is this chronic pain currently being treated and is it adequately controlled? The pain response to a preoperative heat injury may be useful in research in predicting the intensity of postoperative pain.²⁴ The use of secondary analgesics in acute postoperative pain is still in its infancy but shows potential. Gabapentin reduces pain on movement after breast surgery for cancer²⁵

Can we do better than we are at present? An integrated approach to perioperative care (comprising minimally invasive surgical access, optimal pain relief provided by multimodal including epidural analgesia, early oral nutrition, avoidance of nasogastric tubes, and aggressive active mobilisation) decreases time to discharge, readmission rate, and postoperative morbidity with increased patient satisfaction and safety after discharge.²⁶ More staff training, more patient support, more patient information and more suitable analgesic protocols are needed to manage patients' pain effectively, whilst in hospital and also at home following discharge. Prospective studies are required to define more accurately the role of risk factors identified.

Persistent acute postoperative pain offers an opportunity for preventative medicine and highlights the importance of timely interventions to prevent progression from acute to chronic pain and the need for a coordinated approach to managing pain-related disability. It will help alleviate the destructive suffering of chronic pain and relieve the economic burden on healthcare resources. Chronic pain prevention should be made a priority area for further research.

Educating the public on this issue will help pressurise politicians and healthcare providers to adequately resource and expand acute and chronic pain management services in New Zealand.

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