Can Chronic Pain Be Prevented?

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KEYWORDS

• Chronic pain • Persistent postsurgical pain • Acute to chronic pain transition
• Genetics of chronic pain • Multimodal analgesia

KEY POINTS

- Acute pain is an important and appropriate warning system signaling danger to an individual. This pain can persist and become chronic, often serving no further potentially beneficial function, leading to suffering. The pathophysiology behind this transition is under investigation, and significant advances in understanding of the role acute pain has on the development of chronic pain have been made over the past 20 years.
- Although all chronic pain is at one point acute, it is difficult in many chronic pain conditions to identify the precise time point of the beginning of pain. Chronic pain after surgery can serve as a framework for the study of the mechanisms and risk factors of transition to chronic pain because the precise timing of the injury can be identified.
- Various agents and therapeutic options for treating acute pain are available; however, larger randomized clinical trials are needed to identify their role in preventing the transition to chronic pain after surgery.

INTRODUCTION

All patients who undergo a surgical procedure or suffer a traumatic event have some form of acute pain from tissue injury. In most, this acute pain associated with the tissue injury subsides over a short period as the tissue heals. Many patients, however, continue to complain—and suffer—after the "normal" healing process has taken place. Persistent postsurgical pain (PPSP) serves as a framework for studying the development of chronic pain because the precise timing of the injury can be identified.[1] PPSP is an important public health problem with a prevalence approximating the prevalence of chronic pain.[2,3] Patients who experience PPSP may have pain severe enough to interfere with almost every aspect of life, including sleep, mood, work, and social life, which is common in other forms of chronic pain.

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Macrae[4] proposed a working definition of PPSP as pain that should have developed after the surgical procedure and has been present for at least 2 months. Other causes of pain, including pain from a preexisting problem, must first be excluded.

This review begins by looking at the common surgical procedures known to be associated with a high incidence of PPSP. The mechanisms involved in the transition from acute to chronic pain after surgery are reviewed and current understanding on halting the transition by exploiting these mechanisms discussed. Risk factors involved, including medical, psychological, and genetic factors, are assessed. This article concludes by evaluating various treatment options that are at the disposal of anesthesiologists and surgeons.

COMMON SURGICAL PROCEDURES ASSOCIATED WITH PERSISTENT POSTSURGICAL PAIN

Persistent Pain After Breast Surgery

Persistent pain after breast surgery is a clinical problem that affects between 25% and 50% of patients.[5] There are many surgical procedures (lumpectomy, mastectomy, and axillary node dissection) as well as nonsurgical procedures (radiation and chemotherapy) that are usually done in conjunction with surgery.[6] Risk factors proposed include younger age, preoperative pain in other locations, axillary lymph node dissection (compared with sentinel lymph node biopsy or no axillary intervention), radiotherapy, and nerve lesioning.[6] Heterogeneity in current studies makes it difficult to draw conclusions with regard to diagnosis and treatment. Only a few studies have reviewed possible risk factors using a prospective design, adding to the difficulty.[7] Many of the studies did not use current surgical/adjuvant therapy and there are inconsistencies in how chronic pain is defined as well as how preoperative, intraoperative, and postoperative data were collected.[6]

Thoracic Surgery

The incidence of chronic pain after thoracotomy is estimated at 30% to 50%. Injuries to the intercostal nerve by incision, rib retraction, placement of trocars, and suturing are all possible mechanisms[8] and seem to be some of the most important factors.[9] Various groups have evaluated classic risk factors of PPSP after thoracic surgery (ie, preoperative pain, acute pain severity, gender, age, and psychosocial factors) as well as classic factors associated with PPSP in cancer surgery, such as radiation and chemotherapy, with variable results.[9] There are various surgical approaches to performing a thoracotomy, including a posterolateral approach, anterior approach, and a muscle-sparing posterolateral approach. The latter 2 approaches are muscle sparing and may allow for better visualization of the ribs. Khan and colleagues[10] compared a muscle-sparing thoracotomy with a traditional posterolateral approach in 10 patients and noted no difference in chronic pain. Another study looking at 335 patients (148 patients in the muscle-sparing group and 187 in traditional thoracotomy) noted no difference in frequencies of chronic pain 1 year after surgery.[11] An anterior limited thoracotomy may have some benefit in PPSP compared with a posterolateral thoracotomy; however, this result was from a retrospective trial with only 28 patients in each group.[12]

Video-assisted thoracic surgery is a minimally invasive approach that spares the long incision of a thoracotomy. The belief is that small incisions may eliminate nerve injury. Although there is some evidence of this in retrospective studies, prospective studies do not conclude any benefit. Preoperative and postoperative patient factors and missing surgical details preclude any conclusion at to the benefit of