Optimal Analgesia During Major Open and Laparoscopic Abdominal Surgery

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KEYWORDS

- Analgesia • Opioids • Local anesthetic • Acetaminophen
- Antiinflammatory agents • Alpha-2 agonists • Anticonvulsants
- *N*-Methyl-D-aspartate (NMDA) receptor antagonist

KEY POINTS

- Analgesia is a key element of enhanced recovery after surgery (ERAS) programs, particularly following abdominal surgery.
- Multimodal opioid-sparing analgesia is a cornerstone of all analgesic regimens, especially with the use of regular acetaminophen and antiinflammatories.
- Thoracic epidural analgesia is the principal technique for open surgery, but not for laparoscopic surgery, in which intrathecal or more peripherally placed local anesthetic (trunk blocks or wound blocks) is used.
- Several other adjuvants are described but evidence is less strong.
- Interest is growing in the potential for analgesic regimens affecting not only short-term benefits but also longer-term benefits, including rates of cancer recurrence.

INTRODUCTION

Analgesia plays a pivotal role in the management of patients undergoing open or laparoscopic abdominal surgery. Although the relief of pain is one of the most fundamental humanitarian roles for all health care professionals treating patients undergoing surgery, there is now a greater understanding of how this interacts with patient recovery. It has long been recognized that a good analgesic regimen permits not only patient comfort but also facilitates other benefits such as early mobilization and enteral feeding. In the last 20 years, fast-track surgery has evolved into the enhanced recovery after

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surgery (ERAS) program. Pivotal in the philosophy of ERAS is a reduction in the physiologic stress response to surgery and the associated catabolic response. In addition, there is growing evidence to suggest that patients on ERAS have reduced complications following surgery, which affects not only immediate survival but also long-term survival.[1] Although there are many elements to ERAS,[2] analgesic technique plays a large part. In addition, there is interest currently in how anesthetic technique in general, and analgesic technique in particular, may directly affect cancer outcome[3] by modulating immune function. This effect has been shown for breast and prostate surgery[4] but not so far for colorectal surgery.[5] This possibility is particularly relevant for this group of patients, many of whom are undergoing surgery for cancer.

Thus pain medicine has come a long way: correctly administered, it may not only give great relief to patients but may permit rapid return to normal activities and perhaps improve patients' long-term survival through reduction in early postoperative complications.[1,6]

More than 20 years ago, Kehlet and Dahl[7] described multimodal opioid-sparing analgesia, which is the cornerstone of the management of patients undergoing abdominal surgery. Using analgesic techniques acting via different mechanisms, side effects may be minimized and opioid consumption may be reduced. Although some opioid usage may be unavoidable, excess usage leads to a host of undesirable adverse effects: respiratory and cough suppression, postoperative nausea and vomiting (PONV), urinary retention, and delayed return of gastrointestinal (GI) function (**Box 1**). Following major abdominal surgery, the combination of these effects impairs the achievement of important ERAS milestones (**Fig. 1**) and can even be catastrophic; for example, hypoventilation, obtunded respiratory reflexes, and gastric stasis can predispose to passive regurgitation and pulmonary aspiration.

The most significant advance for patients undergoing GI surgery in the last 10 years has been the shift from open to laparoscopic surgery. There is a good evidence base for analgesia for the former, but the optimum analgesic modality for the latter is still debated.[8]

In addition, providing the best and safest analgesia requires more than a prescription. It is essential that regular postoperative input occurs from staff (usually specialist pain nurses) who assess the patients, monitor pain scores, and take appropriate action to relieve pain and treat any ensuing complications (such as hypotension).

OPIOID ANALGESIA

The use of morphine is not viewed as the gold standard for analgesia but has still become the gold standard for comparisons of effectiveness for practically all other

Box 1
Side effects of morphine

- Reduced gastrointestinal motility, leading to ileus
- Nausea and vomiting
- Cough suppression
- Respiratory depression with reduced sensitivity to $Paco_2$
- Urinary retention
- Euphoria, dysphoria, hallucination
- Histamine release (may cause itching, hypotension, and bronchospasm)
- Bradycardia
- Tolerance (over time)