



Postoperative analgesia for thoraco-abdominal surgery – where is the evidence?

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Summary

Major thoracic and abdominal surgery causes significant postoperative pain and other morbidity. Neuraxial regional anaesthesia/analgesia (RA) provides a quality of postoperative analgesia that is superior to systemic opioids and reduces the risks of specific postoperative morbidity indicators (reduction in blood loss, reduced risk of thrombo-embolic events, reduction in duration of ileus, avoidance of opioid side-effects). Effective analgesia, per se, will not change surgical outcome; a postoperative epidural will have no long lasting benefits, except lower pain scores, unless the analgesia provided is used to achieve specific targets – accelerated rehabilitation, early return to oral nutrition etc. In addition, there are independent variables that directly affect outcome and these need to be incorporated with the benefits of RA to improve overall outcome.

REGIONAL ANALGESIA

RA reduces or avoids the need for intra-operative opioids and improves the early indicators of recovery – time to consciousness, the incidence of postoperative nausea and vomiting, return of full cognitive function, time to first supplementary analgesic etc. These improvements in early postoperative outcome justify the use of RA for analgesia (1, 2).

An important benefit related to the quality of analgesia is the reduction in the risk of postoperative chronic pain. A number of risk factors have been identified (3, 4), including the duration and intensity of pre-existing pain and prolonged or poorly managed postoperative pain and can result in significant chronic pain following different surgical procedures, with an incidence of up to 50% for thoracotomy. Epidural analgesia reduces the risk of post-thoracotomy pain syndrome (5), as do paravertebral infusions (6).

The timing of RA analgesia may also be important. Preoperative regional anaesthesia has little influence on postoperative outcome although it improves the management of pre-existing pain states prior to surgery. Pre-emptive analgesia (the ability to reduce the intensity and duration of postoperative pain by instituting effective analgesia before surgery) has been difficult to show in a clinical setting. A review by Ong (7) has shown some pre-emptive benefits for epidural and paravertebral infusions but other reviews have been negative. Systematic reviews by PROSPECT have confirmed that the single most useful clinical factor is to administer appropriate analgesia in a timely manner (whether pre- or intra-operatively) so as to exert its peak effect in the immediate recov-

ery phase following surgery (8) and to maintain effective continuous analgesia for the first 72 hours after major surgery – *Preventative Analgesia*.

Epidural Block

In addition to the improved analgesia, they modulate the neuro-endocrine surgical stress response and several reviews of the beneficial effects of epidural block have been published demonstrating the advantages of this effect. Epidurals improve pulmonary function (9) reduced myocardial infarction risk (10) and earlier return of gastrointestinal function (11). A systematic review, however highlights that the relative benefit of epidural analgesia with regards to reduction in postoperative pulmonary complications has decreased over the last 3 decades probably due to reduced baseline risk from respiratory physiotherapy, avoidance of nasogastric tubes, prophylactic antibiotics, and early mobilization (12). Thus, changing anaesthetic and surgical practice require that we re-evaluate the standards of accepted practice to ensure that they still meet our patient's needs. For example, there is good evidence that epidural analgesia offers significant benefits for open colon resection but these benefits are not so significant for laparoscopic colon surgery. So while Prospect recommends neuraxial blocks for open colectomy, it does not recommend them for laparoscopic colectomy (13).

Thoracic Paravertebral Block (PVB)

Comparative studies of PVB and epidural for post-thoracotomy analgesia show that PVB is equivalent to, or better than, thoracic epidural for pain relief and reduction in the metabolic stress response. Mathews (14) found that both methods gave equally good analgesia using bupivacaine infusions; side effects were less common in the paravertebral group. Richardson showed that PVB was superior to a thoracic epidural for pain at rest and on coughing, oxygen saturation levels, lung spirometry, opioid requirements, stress response markers and complication rates (15).

Two systematic reviews (16, 17) have confirmed the efficacy of PVB for post-thoracotomy analgesia. Davies compared PVB with thoracic epidural and confirmed that the quality of analgesia was equivalent but there were fewer side effects and complications with PVB. The Prospect group looked at all randomised trials where regional technique was used for thoracotomy (epidural, PVB, intrathecal, intercostal and interpleural) and found that, on the balance of equivalent or superior analgesia and fewer adverse events, PVB is recommended for post-thoracotomy analgesia. Compared to intercostal and interpleural techniques, paravertebral blocks offer better quality and longer duration of analgesia and are easier to maintain with a continuous infusion (17, 18).

With advances in surgical and anaesthetic techniques and perioperative care pathways, morbidity and mortality associated with surgery and anaesthesia continue to decrease and there is little difference in intraoperative

risk between regional or general anaesthesia in the absence of avoidable errors. Preoperative fitness, patient age and the surgical procedure itself remain the most important risk factors for major morbidity or mortality.

Independent variables, such as peri-operative fluid balance, active thermoregulatory control and effective postoperative oxygen therapy also have an important bearing on surgical outcome. Traditional surgical practice such as the routine use of nasogastric tubes, delayed enteral nutrition and other fixed determinants of postoperative care fail to maximise the potential improvements in surgical outcome that regional anaesthesia can offer. The key features of regional anaesthesia (quality of analgesia, avoidance of opioid side effects and modulation of the surgical stress response), combined with new surgical techniques and ward routines make it possible to reduce the incidence and severity of complications such as hypoxaemia, fatigue, weight loss and delayed recovery and encourage early nutrition, increased mobility and reduced length of hospital stay. This has led to the development of fast track surgical pathways – ERAS (19, 20)

Given that there are significant risks associated with neuraxial blocks, these techniques should only be used where an effective multimodal rehabilitation programme exists to ensure that the potential improvement in outcome from surgery, such as a reduced length of stay, better functional recovery and increased patient satisfaction can be achieved (21, 22).

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