

Postoperative Thoracic Epidural Anesthesia in Gastrointestinal Surgery: Outcomes, Quality of Life, and Current Controversies

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Abstract: Introduction: Quality of Life (QoL) may be reduced by postoperative pain and improving analgesic techniques, including local and regional techniques, may impact on this important healthcare measurement. This study focused on the QoL issues surrounding thoracic epidural analgesia used in patients undergoing gastrointestinal surgery.

Methods: A review of the published literature (English language, electronic search) was undertaken using the terms: quality of life, analgesia, epidural, thoracic epidural, regional anesthesia, gastrointestinal surgery, colon and rectal surgery, abdominal surgery, major surgery, complications, pain scores. There were no exclusions and all relevant literature was included in the breadth of discussion.

Results: Epidural analgesia may improve pain, sedation scores, pulmonary function, tissue oxygenation, and QoL but there may be little impact on overall patient morbidity and mortality. The relative paucity of data and diminutive power of many clinical studies represent a challenge to establishing superiority or equivalence of epidurals over patient-controlled opiate analgesia but emerging evidence suggests an improved QoL, perhaps through less sedation and faster recovery of gastrointestinal function.

Conclusions: The benefits of postoperative thoracic epidural analgesia include better analgesia and overall well-being in addition to the intuitive advantages of less sedation and improved pulmonary function following gastrointestinal surgery.

INTRODUCTION

Quality Of Life (QoL) and other patient-outcome studies may reveal important differences between treatment options from the perspective of the patient [1-6]. These patient-centered, evidence-based data are important for planning interventions, including post-operative analgesia, since religious and / or cultural differences may obviate some procedures [7-12]. Major surgery imposes pain, physical, mental, and physiological stresses that translate into diminished QoL [1-13]. Although the patient's inflammatory responses to both the pathology and its extirpation are programmed by genetic polymorphisms that may influence outcomes [14-16], the type of surgical intervention is the major determinant impacting on QoL [17].

PAIN AND QUALITY OF LIFE

Irrespective of major operation category, pain is the most prevalent symptom that generates fear and anxiety such that analgesic failure significantly reduces QoL [1,18,19]. It is estimated that 50-70% of patients have inadequate pain relief despite some form of post-operative regime [18]. This leads to pathophysiological changes that include: increased sympathetic tone, deranged metabolic and neuro-endocrine responses, and impaired muscle functioning [1,19-21]. Inflammatory responses may be reduced by minimally-invasive surgical techniques (e.g. muscle-sparing thoracotomy and laparoscopic surgery) while limitation of endocrine and metabolic changes may be induced by peri-operative corticosteroids and/or neural blockade [22,23].

THORACIC EPIDURAL ANALGESIA

Prospective randomized trials (only 36 - 65 patients each) have found thoracic epidural analgesia (TEA) superior to PCA in delivering pain relief following major thoracic / abdominal surgery [24-27,29-31]. One randomized trial of 64 patients undergoing colonic surgery found TEA to have a positive impact on mobilization, restoration of bowel function, and QoL at 3 to 6 weeks post-operatively [27]. It is unlikely that better analgesia alone decreases perioperative morbidity and improves QoL when technical factors such as the correct placement of internal sutures lessens pain [21,27, 32,33]. Regional analgesic techniques provide physiological benefits over PCA (e.g. better gastrointestinal motility and mucosal blood flow / oxygenation) by inhibiting sympathetic outflow and facilitating parasympathetic drive [33-40]. While TEA promotes faster recovery of bowel function and earlier fulfillment of discharge criteria the initial experience in open colorectal surgery has been that length of stay is unaltered [24,27,41-43]. For example, two randomized trials in elective open segmental colectomy (54 and 42 patients respectively) found better analgesia and faster return of bowel activity with TEA over PCA but this did not translate into better overall stay or calorie/protein intake [41,43]. This may reflect stress-induced protein catabolism (gluconeogenesis) following open abdominal surgery despite putative smoother glycemic changes with epidurals [44,45]. A recent trial randomized 58 patients undergoing open segmental colectomy to TEA or PCA under a controlled rehabilitation program without difference in pain, QoL, or length of stay but 1/5 had a failed epidural (adding to the 45% complication rate in that group) so a type II error is likely [46].

LAPAROSCOPIC SURGERY

The data for laparoscopic segmental colectomy is open to interpretation. The Cleveland Clinic performed a prospective

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cohort study comparing 44 patients undergoing laparoscopic segmental colectomy evenly distributed between TEA and PCA and concluded that an epidural was “an important component of a postoperative care protocol” because the length of stay was shorter [47]. Two years later the same authors performed a randomized trial of 38 patients undergoing laparoscopic segmental colectomy and found TEA to significantly improve pain relief in the early post-operative period but by then their streamlined length of stay was unaffected [48].

MORBIDITY

Patients undergoing major surgery are at risk of pulmonary complications due to dysfunction of diaphragmatic, intercostal, and abdominal musculature and, if analgesia is inadequate, due to poor tidal volumes, ineffective expectoration, and inadequate responses to physiotherapy [33,49,50]. In 2000, a systematic overview of randomized, controlled trials found that the use of epidural / spinal anesthesia may reduce post-operative morbidity and mortality [51]. However, this may reflect the diversity of the studies up to then because subsequent large, multi-centre, randomized, controlled trials failed to identify a significant reduction in overall morbidity and mortality in general surgery [52-54]. The MASTER trial and Veterans Affairs studies (over 900 patients each) demonstrated improved analgesia but only a modest reduction in the incidence of respiratory failure and overall morbidity and mortality was unaffected by epidural use in high risk patients [53,54]. It has been reported that TEA decreases the size of myocardial infarction in canine models of ischaemia, and may improve coronary blood flow by blocking sympathetic-mediated vasoconstriction in patients [52,55-57]. However, this does not extend to high-risk patients undergoing major vascular surgery where cardiac insult is large regardless of epidural use [58].

SUMMARY AND CONCLUSION

Compared to PCA, epidural analgesia may improve pulmonary function and tissue oxygenation by attenuating spinal reflex inhibition of diaphragmatic function, lowering pain and sedation scores, and facilitating patient participation in physiotherapy [33,59-62]. Such benefits of TEA positively impact on healthcare delivery and potentially improve the QOL of patients, even if overall cardiorespiratory morbidity is unaltered. Future randomized trials with adequate sample size considerations will properly assess the impact of TEA on patient-centered outcomes such as level of satisfaction with analgesic delivery, degree of physical mobility, psychological well-being, and overall quality of life.

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