



## Enhanced recovery programme in colorectal surgery: Does one size fit all?

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### Abstract

Enhanced recovery after surgery (ERAS) employs a multimodal perioperative care pathway with the aim of attenuating the stress response to surgery and accelerating recovery. It has been difficult to determine the relative importance of some of the individual components of these pathways such as epidural analgesia and laparoscopic colorectal surgery. Some argue that only a rigid adherence to the published ERAS protocol can achieve the proposed benefits of fast-track surgery. In this article, we explore some of the areas where the evidence base may be changing and ask whether a more flexible and individualised approach should be considered.

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**Key words:** Enhanced recovery; Fast-track; Laparoscopic; Intravenous fluid; Postoperative analgesia

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### INTRODUCTION

Enhanced recovery after surgery (ERAS) or "fast track surgery" is a concept first described by Kehlet<sup>[1]</sup> in the early 1990's. The approach employs a multimodal perioperative care pathway with the aim of attenuating the stress response to surgery and accelerating recovery<sup>[2]</sup>. Implementation of enhanced recovery protocols has led to improved outcomes across a range of different specialties including reductions in postoperative morbidity and hospital stay<sup>[3-5]</sup>.

The fundamental premise of ERAS is the incorporation of evidence-based practice. It would seem to follow therefore that the evolution of enhanced recovery guidelines should be dynamic, allowing modifications of certain aspects of the program as new data becomes available. Some authors have advocated a rigid adherence to the ERAS protocol, citing study data that demonstrates a proportional relationship between deviation from the protocol and increased morbidity<sup>[6]</sup>. However, as evidence for components of the ERAS protocol change, it may be that a more flexible and individualised approach should be considered.

### PERIOPERATIVE FLUID ADMINISTRATION

Traditionally, patients undergoing major colorectal surgery have received liberal volumes of intravenous fluids<sup>[7]</sup>. Excess intravenous fluid during and after surgery has been associated with delayed gut function and increased complication rates<sup>[8-10]</sup>. Fluid restriction has been proposed as a possible method of improving recovery and reducing postoperative complications. Brandstrup *et al*<sup>[10]</sup> found that randomising patients undergoing elective colorectal

resection to a restricted fluid protocol reduced cardiopulmonary and wound morbidity. MacKay *et al*<sup>[11]</sup> found no difference in recovery of gastrointestinal function or time to discharge with postoperative fluid restriction while using a conservative intra-operative protocol.

Goal directed fluid therapy *via* oesophageal Doppler (OD) monitoring offers an opportunity to individualise peri-operative fluid administration. OD provides a real time representation of haemodynamic function, and has been shown to be comparable with other methods for estimating cardiac output such as LIDCO. A number of studies have shown that goal-directed fluids reduce morbidity, critical care admissions, and hospital stay<sup>[12]</sup>. It is not clear however whether these benefits are still significant within an enhanced recovery protocol.

Other goal-directed techniques employ central venous oxygen saturation (ScvO<sub>2</sub>) as a surrogate for mixed venous oxygen saturation. ScvO<sub>2</sub> is related to tissue oxygenation and so can be used to titrate oxygen and fluid therapy, particularly in the immediate postoperative period. This approach requires central venous access which is not always available as some groups have developed a less invasive approach to monitoring. While a number of different fluid protocols have been proposed, the optimal approach is still unclear.

## EVOLVING POSTOPERATIVE ANALGESIA

Epidural analgesia was considered central to early ERAS protocols, since it reduces the endocrine-mediated stress response<sup>[13,14]</sup>, and improves postoperative intestinal function<sup>[15]</sup>. Epidural analgesia also provides superior pain control to systemic opiates, particularly in the first 24-36 h after surgery<sup>[16]</sup>. Data on the effect of epidural analgesia come predominantly from studies in open surgery while the benefits in laparoscopic surgery are less clear. Levy *et al*<sup>[17,18]</sup> performed a meta-analysis to address this question but concluded that there was a paucity of quality data. The authors subsequently performed a study in which patients were randomised to receive epidural, spinal or patient-controlled opiate analgesia following elective laparoscopic colorectal resection. They demonstrated a significantly longer hospital stay, time to return of bowel function and duration of nausea in the epidural group. Intra-theal morphine has been proposed as an alternative<sup>[19]</sup>. A meta-analysis provides encouraging results in patients undergoing abdominal surgery; reduced post-operative pain in the first 48 h and significantly reduced opiate consumption compared with systemic opiates<sup>[20]</sup>. Transversus abdominus plane blocks have also been gaining in popularity although comparative data is still lacking<sup>[21]</sup>.

Epidurals can cause vasodilatation and hypotension<sup>[22]</sup>, resulting in excess fluid challenges, third space shift and fluid overload. As studies emerge demonstrating benefits of alternative analgesic techniques, it does raise the question: Should epidural analgesia be the standard technique for all colorectal resections? Perhaps a more individualised approach dependent on the procedure,

use of laparoscopy and placement of incisions should be considered. In this way more patients may be able to avoid potential complications while maintaining adequate analgesia and facilitating early mobilisation.

## LAPAROSCOPIC AND OPEN SURGERY IN ENHANCED RECOVERY

The adoption of laparoscopic techniques within colorectal surgery came at a similar time to the introduction of "fast-track" surgery. Early studies examining the effect of laparoscopic surgery showed clear superiority in short term outcomes when compared with open surgery using traditional recovery technique<sup>[23,24]</sup>. Patients undergoing laparoscopic surgery have reduced in-patient stays, less morbidity and improved postoperative pain<sup>[25,26]</sup>. What is less clear is how much of the benefit is attributable to laparoscopy and how much is an effect of differing peri-operative care pathways.

Since these early trials there have been a number of small trials comparing laparoscopic and open colorectal surgery within an enhanced recovery setting with conflicting results<sup>[11,26-28]</sup>. Most recently, Vlug *et al*<sup>[29]</sup> performed a four-armed randomised study of patients undergoing either open or laparoscopic surgery, in an enhanced recovery or standard recovery programme. They demonstrated a significantly faster recovery time following colonic surgery in those patients undergoing laparoscopic procedures within an ERAS programme.

What is clear is that there are still a number of areas within the enhanced recovery protocol where the evidence-base continues to change. The relative contributions of different facets of the protocol also remain to be determined. While this is the case we should accept a flexible approach to facilitate the adoption of techniques supported by randomised data. There may also be scope for a degree of individualisation to reflect the wide range of patients and procedures to which enhanced recovery is now being applied.

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