

Enhanced recovery after surgery: an update for the generalist

General surgery has evolved almost beyond recognition over the past 50 years. While always a technical discipline, major advances in surgical technology have been made. Along with these technical advances there have been concomitant major changes in peri-operative care. The art and science of peri-operative care has almost become a specialty in itself, with surgeons, anaesthetists, medical specialists, and nurses and others working together to optimise this process. However, this has not been clearly signalled to clinicians outside of the hospital. This article aims to describe these developments to the generalist non-hospital clinician.

Enhanced recovery after surgery (ERAS) refers to evidence-based, multidisciplinary peri-operative care protocols that aim to improve recovery following surgery. ERAS was originally known as fast-track surgery and was first introduced by Henrik Kehlet in Denmark for patients undergoing colonic surgery.¹ Subsequently, protocols have been developed for many surgical procedures to reduce morbidity, enhance recovery and shorten the length of stay following major surgery, and save considerable sums of money.²⁻⁴ Current Australian guidelines recommend the implementation of ERAS.⁵

Central to successful ERAS are a multidisciplinary team approach to care and strict adherence to the protocol with careful attention paid to patients who are unable to achieve care goals. An ERAS protocol contains several evidence-based elements that are specific to the procedure.

Pre-operative care

It is important to optimise medical comorbidities and perform a clinical risk assessment. Social and behavioural factors, such as cigarette smoking, excessive alcohol consumption and illicit drug use, should be addressed. The patient should be assessed pre-operatively for pre-existing malnutrition.⁶ Pre-operative exercise programs, often called prehabilitation, are incorporated into some ERAS protocols; however, at present there is limited evidence to suggest they influence clinically important outcomes.⁷

Patient education and counselling play a significant role in the success of facilitating timely discharge. This includes discussions on recovery milestones, expected date of discharge, and warning signs that warrant a surgical review following discharge. Planning should also commence at this stage to enable the surgery to be completed in the optimal environment for recovery.⁸

Fasting reduces the risk of aspiration at induction of general anaesthesia. ERAS protocols typically include a carbohydrate rich drink two hours before the induction of anaesthesia. This practice is associated with lower pre-operative thirst, hunger and anxiety. Where mechanical bowel preparation is indicated,

oral antibiotics may be used, although this remains controversial.⁹

There is great potential for the involvement of primary care in pre-operative care. An important role lies in pre-operative preparation, which includes the key lifestyle changes described above.¹⁰ Other areas include assessing and improving nutrition, improving physical fitness, and optimising comorbidities. Another role is counselling and educating the patient about surgery, anaesthesia, and the post-operative course to reduce anxiety.¹¹

Intra-operative management

Multimodal analgesic agents and avoidance of long-acting anaesthetic agents are favoured during surgery. Typical anaesthetic regimens include short-acting anaesthetic agents, such as propofol, and inhaled anaesthetics, such as sevoflurane. Pre-operative sedatives should be avoided as they can cause respiratory depression and post-operative sedation. Further, long-acting opioids and long-acting paralytic agents should be avoided to allow patients to recover rapidly from anaesthesia. A peripheral nerve stimulator to measure and prevent profound muscle paralysis is used, and paralytic agents are reversed at the conclusion of surgery to prevent ongoing paralysis that may be associated with post-operative respiratory complications.³

Restrictive fluid therapy is recommended, aiming to prevent fluid overload by replacing only the fluid that is lost during surgery. Some recommend goal-directed fluid therapy, aiming to optimise fluid administration using a variety of techniques. This strategy may be unnecessary if pre-operative dehydration is avoided.¹

Intra-operative monitoring of body temperature and the routine use of body warmers are important as body temperature changes can occur due to exposure during surgery and impairment of body temperature regulation mechanisms as a consequence of anaesthesia. Changes in body temperature are associated with morbidity including adverse cardiac events, coagulopathy, and increased surgical site infections.¹²

Multimodal analgesia strategies aim to optimise post-operative pain relief while minimising opioid use. These include liberal use of non-opioid analgesics, management of somatic pain by infiltration of long-acting local anaesthetic agents at port sites, rectus sheath catheters and regional anaesthesia such as epidural blockade or transversus abdominis plane blockade, and management of visceral pain by intraperitoneal infusions of local anaesthetic.^{3,13}

Post-operative care

Diet can be safely resumed within a few hours after surgery when the patient is fully conscious. Early

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post-operative mobilisation is a crucial component of all ERAS protocols.^{3,6}

Prolonged post-operative ileus is a common problem after colorectal surgery and is a major cause of patient discomfort and prolonged hospital stay. Strategies for decreasing ileus include early feeding, minimisation of opioid analgesia, minimal access surgery, avoidance of prophylactic nasogastric tube placement, and maintenance of euvolaemia. There is evidence to suggest that μ -opioid receptor antagonists may reduce post-operative ileus.¹²

Patients undergoing major surgery, especially for malignancy, are at a high risk of developing deep vein thrombosis. Chemical prophylaxis usually involves subcutaneous administration of unfractionated heparin, and mechanical methods include intermittent pneumatic compression, graduated compression stockings, and venous foot pumps.³

Implementing an ERAS program

Establishing an ERAS program in a hospital is not necessarily easy. A survey of surgeons in Australia found that there are challenges but these can be overcome.¹⁴ Some key principles for successful implementation include:

- ERAS is a team sport. Essential to the team implementing the program are a surgeon, an anaesthetist and a senior nurse. Managers are usually very supportive as the financial case has been clearly established.⁴
- Simplicity in ERAS protocols is imperative in their implementation and long term success. ERAS protocols must be evidence-based, cost-effective, and easy to implement.¹⁵ Too many unnecessary elements result in a protocol that is cumbersome and difficult to implement.
- Recording of outcomes and measurement of compliance with the ERAS protocol are vital and should be audited regularly to optimise patient outcomes and incorporate new evidence-based interventions.

ERAS peri-operative care protocols have been as impactful as minimal access techniques in improving outcomes following major surgery. Implementing these protocols is challenging, but determined and well organised multidisciplinary teams can make meaningful improvements in surgical outcomes. There is likely to be significant benefit in engaging more strongly with primary care in the future.

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