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Enhanced recovery after surgery: key principles for colorectal surgery

Elective surgery action plan

Introduction

Enhanced recovery after surgery (ERAS) models are multi-modal perioperative care pathways. They are designed to achieve early recovery after surgical procedures by maintaining preoperative organ function and reducing the profound stress response following surgery. The key elements of colorectal ERAS models include preoperative patient education, appropriate multi-modal analgesia, avoidance of nasogastric tube, early feeding and early mobilisation.

These models attempt to modify the physiological and psychological responses to major surgery. They have been shown to lead to:

- a reduction in complications and hospital stay
- improvements in cardio-pulmonary function
- earlier return of bowel function
- earlier resumption of normal activities.

Attitudes towards the importance of specific ERAS interventions in colorectal surgery were recently reported in a survey of colorectal surgeons from Australia and New Zealand.[1]

Aims of the initiative

- Improve patient and carer participation in health-related decisions and engagement with care
- Reduce length of stay in hospital without compromising morbidity
- Optimise use of health system resources

Preoperative patient education

Comprehensive pre-operative patient education is an important aspect in achieving improved patient satisfaction, reduced length of stay, reduced readmission rates and fewer complications.[2] Education should be detailed, procedure specific and patient centred. It is generally provided by the multi-disciplinary team at the pre-admission clinic, and resources can also be made available online. The ACI can share examples of patient education provided at existing centres utilising ERAS models.

Early removal of indwelling catheter

Urinary drainage during and after colorectal surgery is traditionally used for two main reasons: prevention of urinary retention and monitoring of urine output.[3] The duration of catheterisation is directly related to a risk of urinary tract infection and may hinder post-operative mobilisation and should therefore be limited.[3] Early removal of indwelling catheter (IDC) is encouraged, and generally occurs on day one for colon surgery, and day two for rectal surgery.

Appropriate multi-modal analgesia

A key component of ERAS is the use of multi-modal analgesia, an acute-pain reduction protocol that reduces reliance on opioids and harnesses the benefits of multiple pain medications to target more than one pain pathway. Optimal post-operative pain management can lead to a quicker recovery, improved patient outcomes and a reduce length of stay.[4]

Minimally invasive surgery

A minimally invasive approach to colon and rectal surgery has clear advantages for:

- improved and more rapid recovery
- reduced general complications
- reduced wound-related complications.[3]

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Avoidance of nasogastric tube

The routine insertion of a nasogastric (NG) tube during elective colorectal surgery should be avoided. If inserted during surgery, it is recommended that the tube be removed before reversal of the anaesthesia. Use of NG tubes has been shown to increase the rate of respiratory compilcations. Studies have also shown that early oral feeding reduces hospital length of stay and total post-operative complications significantly, with no significant differences in anastomotic dehiscence, pneumonia, wound infections, rate of NG tube reinsertion, vomiting or mortality.[5]

Early feeding and early mobilisation

Delays in the resumption of a normal oral diet after major surgery are associated with increased rates of infectious complications and delayed recovery. Most patients undergoing elective colorectal surgery can, and should, be offered food and oral nutritional supplementation from the day of surgery.[3]

Early mobilisation through patient education and encouragement is an important component of ERAS models. Prolonged immobilisation is associated with a variety of adverse effects.[3]

Enablers for implementation

As part of this project, the ACI has established an ERAS working group consisting of surgeons, anaesthetists, nurses and allied health staff at centres with existing ERAS programs. The ERAS working group is looking at best practice parameters to assist new sites to implement the ERAS colorectal model. The working group is also working to understand variations in care in ERAS. Local teams will be provided with support to understand current practice in relation to:

- the key principles
- sharing successes and challenges
- learning improvement strategies
- collaborating with peers.

As the ERAS project progresses, the working group is aiming to develop a best practice model for colorectal ERAS, to be available statewide.

The ACI is supporting hospitals in implementing the colorectal ERAS model. A systematic review found that the key facilitating factors to implementing ERAS were:

- adapting the program to fit local contexts
- achieving and demonstrating early wins
- gaining buy-in from both frontline clinicians and hospital leadership
- having a strong enhanced recovery program team that met regularly
- leveraging supporters
- full-time enhanced recovery pathway staff.[6]

The following four domains will be vital to successfully implementing a colorectal ERAS model.

1. Robust governance and clinical oversight

Clinical leadership is an essential requirement for implementing a new model of care.

Implementation should be guided by an agreed project plan that is appropriately resourced. Local steering committees and working groups should be established to support the ERAS coordinator or project lead in developing and implementing an ERAS program.

It is essential to identify all relevant stakeholders who may be impacted by the introduction of an ERAS pathway. This includes clinical and non-clinical staff and will require executive leadership. Steering committees or working groups should include representation from surgical, anaesthetic, nursing and allied health. Developing and agreeing on clinical pathways will assist with clinical consensus regarding the management of ERAS patients.

2. Resourcing

Implementing a new model has the potential to impact resourcing. It is important that expectations are set early regarding what is achievable using available resources. For example, is it feasible to recruit an ERAS coordinator utilising existing resources or will the responsibility be incorporated into an existing role? Consideration may also need to be given to the flow-on effect to the physiotherapy or dietetic service to support patients in the pre- and post-operative phases. There could also be the need for additional capacity within the pre-admission clinic. Other resources may include printing of clinical pathways and patient education booklets.

3. Commitment to patient and staff education

It is important that information is provided to patients in a manner that supports health literacy and builds trust. The ERAS process should be clearly explained, and expectations set for each day following surgery. Patients should also be motivated to adhere to the ERAS pathway.

It is acknowledged that new graduates, staffing turnover and junior medical officer changeover may impact upon the implementation of ERAS. Therefore, ongoing education of new medical, nursing and allied health staff is required.

4. Commitment to gathering and auditing data

Collection and auditing of data is an important consideration to facilitate the implementation and monitor of compliance, with the ERAS model. Specific data points may include:

- percentage of patients successfully completing the ERAS pathway
- length of stay
- complication rates
- readmission rates
- staff experience
- patient-reported measures.

List of ERAS interventions

The main ERAS interventions used in the pre-admission, pre-operative, intra-operative and post-operative phases are listed below in Figure 1.

Figure 1. Example of guideline elements for colonic resections adapted from Ljungqvist et al, 2017[7]

	Intervention	Target effect and/or comment
Pre-admission	Cessation of smoking and excessive intake of alcohol	Reduce complications
	Pre-operative nutritional screening and, as needed, assessment and nutritional support	Reduce complications
	Medical optimisation of chronic disease	Reduce complications
Pre-operative	Structured pre-operative information and engagement of the patient and carers	Reduce anxiety, involve the patient to improve compliance with protocol
	Pre-operative prophylaxis against thrombosis	Reduce insulin resistance, improve well-being, possibly faster recovery
	Pre-operative prophylaxis against thrombosis	Reduce thromboembolic complications
	Pre-operative prophylaxis against infection	Reduce infection rates
	Prophylaxis against nausea and vomiting	Minimise post-operative nausea and vomiting
Intra-operative	Minimal invasive surgical techniques	Reduce complications, faster recovery, reduce pain
	Standardised anaesthesia, avoiding long-acting opioids	Avoid or reduce post-operative ileus
	Maintaining fluid balance to avoid over- or underhydration, administer vasopressors to support blood pressure control	Reduce complications, reduce post-operative ileus
	Epidural anaesthesia for open surgery	Reduce stress response and insulin resistance, basic postoperative pain management

	Intervention	Target effect and/or comment
Intra-operative (cont.)	Restrictive use of surgical site drains	Support mobilisation, reduce pain and discomfort, no proven benefit of use
	Removal of nasogastric tubes before reversal of anaesthesia	Reduce the risk of pneumonia, support oral intake of solids
	Control of body temperature using warm air flow blankets and warmed intravenous infusions	Reduce complications
Post-operative	Early mobilisation (day of surgery)	Support return to normal movement
	Early intake of oral fluids and solids (offered the day of surgery)	Support energy and protein supply, reduce starvation-induced insulin resistance
	Early removal of urinary catheters and intravenous fluids (morning after surgery)	Support ambulation and mobilisation
	Use of chewing gums and laxatives and peripheral opioid-blocking agents (when using opioids)	Support return of gut function
	Intake of protein and energy-rich nutritional supplements	Increase energy and protein intake in addition to normal food
	Multimodal approach to opioid-sparing pain control	Pain control reduces insulin resistance, supports mobilisation
	Multimodal approach to control of nausea and vomiting	Minimise post-operative nausea and vomiting and support energy and protein intake
	Prepare for early discharge	Avoid unnecessary delays in discharge
	Audit of outcomes and process in a multiprofessional, multidisciplinary team on a regular basis	Control of practice (a key to improve outcomes)

Evidence base

The *Enhanced Recovery After Surgery: key principles for colorectal surgery, elective surgery action plan* was informed by the 2020 evidence check for *Resuming elective surgery – post-surgery innovations: enhanced recovery after surgery, early mobilisation and discharge*. For the evidence check, PubMed was searched on the 27 June 2020 using the following search terms:

("Enhanced Recovery" OR ERAS OR "early mobilisa*" OR "Resistance Training" OR "early discharge" OR ((virtual OR "tele*") AND (rehabilitation OR "follow up" OR "follow-up"))) AND ((((((surgery[MeSH Subheading]) OR (surgical procedures, operative[MeSH Terms])) OR (general surgery[MeSH Terms])) OR (surgi*[Title/Abstract])) OR (surge*[Title/Abstract])))

This evidence was supplemented with experiential evidence from subject matter experts to ensure key principles were practical for local implementation.

The ERAS Working Group developed the document. Consultation was undertaken with the Anaesthesia Perioperative Care Network, Surgical Services Taskforce and local health districts.

For further information

Please contact the Surgery and Anaesthesia team at aci-surgery@health.nsw.gov.au.

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