Important Information Before You Begin

A Provincial Clinical Knowledge Topic is the evidence-informed clinical best practice standard for a specific patient population. Enhanced recovery after surgery (ERAS) Topic content is based on recommendations from published international guidelines and other evidence, with consideration for current practices at ERAS sites and other clinical standards. Topic information strives to adhere to Institute for Safe Medication Practices (ISMP) safety standards, and align with provincial and national Quality and Safety initiatives and standards, e.g. Health Quality Council Alberta (HQCA), Choosing Wisely, Safer Healthcare Now, and Accreditation Canada. The Topic will be reviewed periodically and updated according to best practice evidence and other clinical recommendations and guidelines.

Clinicians using this Topic should, in consultation with the patient, use independent medical judgement in the context of individual clinical circumstances to direct care.

Guidelines

This Topic is based on the following guidance:

3) Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 1: pathophysiological considerations
4) Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 2: consensus statement for anaesthesia practice
5) Clinical Practice Guidelines for Enhanced Recovery After Colon and Rectal Surgery From the American Society of Colon and Rectal Surgeons and Society of American Gastrointestinal and Endoscopic Surgeons

Keywords

- ERAS
- Enhanced recovery
- Colorectal
- Colon
- Bowel
- Surgery
- Adult
ERAS Colorectal Surgery, Adult – Inpatient

Rationale

International ERAS guidelines were developed to improve patient outcomes, accelerate recovery after surgery, and reduce healthcare costs. ERAS is a multimodal approach, with interventions across all stages of surgical care. Refer to Enhanced Recovery After Surgery: A Review.

The international ERAS guidelines were used in the refinement of provincial clinical care pathways for enhancing recovery after surgery. There are Alberta Health Services (AHS) ERAS clinical care pathways developed for Breast Reconstruction (not applicable outside of Foothills Medical Centre and Misericordia Community Hospital), Colorectal, Cystectomy, Gynecologic Oncology (not applicable outside of Foothills Medical Centre and Royal Alexandra Hospital), Liver, Major Gynecology, Major Head and Neck (not applicable outside of Foothills Medical Centre and University of Alberta Hospital), and Pancreas surgery. These clinical care pathways are detailed in surgery-specific ERAS Topics.

Certain criteria must be met for a patient to be considered for inclusion in one of the ERAS clinical care pathways. See the Rationale section in each ERAS Topic for specific surgical procedures appropriate for inclusion.

The inclusion criteria (applicable as of July 1, 2017) for the ERAS Colorectal Surgery, Adult - Inpatient clinical care pathway are
  - Adult surgical inpatient undergoing scheduled surgery within Alberta for any of the following colorectal procedures
    o Altemeier’s Procedure
    o Abdominal Perineal Resection
    o Anterior Rectosigmoid Resection
    o Anterior Resection
    o Bowel Resection
    o Closure of Colostomy
    o Closure of Loop Ileostomy
    o Colostomy
    o Completion of Proctectomy - J pouch anastomosis
    o Excision of an Ileal pouch/anal anastomosis (IPPA)
    o Ileocecal Resection
    o Ileostomy
    o Low Anterior Resection
    o Left Hemicolecotomy
    o Completion of Proctectomy
    o Proctocolectomy
    o Right Hemicolecotomy
    o Reversal of a Hartmann’s procedure
    o Small Bowel Resection
    o Sigmoidectomy
    o Subtotal Colectomy
    o Total Colectomy
While all eligible patients should be started on the ERAS Colorectal Surgery, Adult - Inpatient clinical care pathway, individual patient care plans may need to be modified based on surgical findings or additional procedures. Colorectal surgery patients who do not meet the inclusion criteria (e.g., those undergoing hernia repair, transanal endoscopic microsurgery (TEMS), fistulotomy, hemorrhoidectomy, anal advancement flap, examination under anesthetic (EUA), EUA and insertion of a seton, any procedures that include Hyperthermic Intra-peritoneal Chemotherapy (HIPEC), and procedures for acute palliative-symptom management) may still be considered for applicable recommendations in the ERAS Colorectal Surgery, Adult - Inpatient clinical care pathway.

**Goals of Management**

The goals of clinical management for enhancing recovery of scheduled adult inpatient surgical patients are to

1. Decrease
   - surgical care length of stay (acute and total) with no increase in readmissions or use of emergency, specialty or primary care related to the post-surgical care
   - surgical complications delaying discharge
   - serious surgical complications including reoperations
2. Increase
   • positive surgical care experiences for patients and families, and providers
   • compliance with ERAS recommendations
This can be achieved by engaging patients and families, clinicians and staff in a multidisciplinary evidence-informed ERAS clinical care pathway focused on
   • patient preparation that includes preoperative optimization, an explanation of the surgical procedure, as well as postoperative expectations and goals to maximize patient participation in their surgical care journey
   • preoperative fasting and carbohydrate loading following national anesthesia guidelines
   • appropriate prophylaxis to prevent or reduce surgical complications including venous thromboembolism (VTE), surgical site infections, nausea and vomiting
   • multimodal, opioid-sparing analgesic approaches to improve the management of perioperative pain, nausea and vomiting
   • management of physiological surgical stress response
   • maintenance of normothermia
   • minimally invasive surgical approaches
   • balanced fluid management
   • avoidance of, or early removal of drains and tubes
   • mobilization soon after surgery
   • stimulation of gut motility
   • offer of food and drinks soon after surgery with appropriate nutrition supplements

ERAS Colorectal Surgery, Adult – Inpatient: Recommendations
Note: ERASAlberta recommendations are based on published international ERAS guidelines and other evidence, with consideration for current practices at ERAS sites and other clinical standards. ERAS® Society recommendations are from the Table of Recommendations within ERAS® Society Guidelines. The GRADE7 methodology was used to determine quality of evidence and strength of recommendation for each ERAS® Society recommendation.

Preoperative information, education and counselling
ERASAlberta Recommendation: Same as the ERAS® Society recommendation below.

- **ERAS® Society Recommendation**: Patients should routinely receive dedicated preoperative counselling (regarding activity, drains/tubes/lines, and expectations regarding hospital discharge). Additional education for the marking and management of stomas for rectal surgery only.
- **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (Low); Rectal Surgery (Low)
- **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Strong)

Preoperative optimization
ERASAlberta Recommendation: Same as the ERAS® Society recommendation below with the following additions: anemia should be actively identified, investigated, and corrected preoperatively. Patients should be screened for nutritional status including weight loss within the previous 6 months. All patients at nutrition risk need an assessment to confirm malnutrition. If a
patient is malnourished, an in-depth nutrition assessment, along with treatment, is required by a dietitian.

- **ERAS® Society Recommendation**: Preoperative general medical optimization is necessary before surgery. Smoking should be stopped four weeks before surgery. Alcohol consumption especially for alcohol abusers should be stopped four weeks before surgery. Increasing exercise preoperatively may be of benefit. Preoperative nutritional support should be considered for malnourished patients.

- **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery: Optimization (Not available); Smoking cessation (High), Alcohol cessation (Low); Rectal Surgery: Medical optimization (Moderate), Pre-habilitation (Very Low), Smoking cessation (Moderate), Excess alcohol cessation (Low)

- **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery: Optimization (Not available); Smoking and Alcohol cessation (Strong); Rectal Surgery: Medical optimization (Strong), Pre-habilitation (No), Smoking cessation (Strong), Excess alcohol cessation (Strong)

**Preoperative bowel preparation**

**ERASAlberta Recommendation**: Current evidence supports that if mechanical bowel preparation (MBP) is to be used, it should be in combination with preoperative oral antibiotics to minimize perioperative infectious complications.

- **ERAS® Society Recommendation**: Mechanical bowel preparation (MBP) should not be used routinely in colonic surgery. In general, MBP should not be used in pelvic surgery. However, when a diverting ileostomy is planned, MBP may be necessary (although this needs to be studied further).

- **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (High); Rectal Surgery: Anterior resection - no MBP (High), Total mesorectal excision (TME) with diverting stoma – use MBP (Low)

- **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery: Anterior resection (Strong), TME with diverting stoma (Weak)

**Preoperative fasting and carbohydrate load treatment**

**ERASAlberta Recommendation**: Before scheduled procedures, the minimum duration of preoperative fasting should be 8 hours after a meal that includes meat, fried or fatty foods, 6 hours after a light meal (such as toast and a clear fluid), and 2 hours after clear fluids as per the Canadian Anesthesiologists’ Society Guidelines to the Practice of Anesthesia - Revised Edition 2018. Carbohydrate load treatment should occur between 2 and 3 hours prior to the administration of anesthesia.

Note: The Provincial Clinical Knowledge Topic: Perioperative Diabetes Management is under development and will further inform the ERASAlberta recommendation.

- **ERAS® Society Recommendation**: Clear fluids should be allowed up to 2 hours and solids up to 6 hours prior to induction of anesthesia. Preoperative oral carbohydrate treatment should be used routinely and administered to all non-diabetic patients. In diabetic patients carbohydrate treatment can be given along with the diabetic medication.
• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery: Solids and fluids (Moderate), Carbohydrate loading overall (Low), Carbohydrate loading in diabetic patients (Very Low); Rectal Surgery: Solids and fluids (Moderate), Carbohydrate loading - reduced preoperative insulin resistance (Moderate), Carbohydrate loading - improved clinical outcomes (Low)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery: Fasting guidelines (Strong), Preoperative carbohydrate drinks (Strong), Preoperative carbohydrate drinks in diabetic patients (Weak); Rectal Surgery: Solids and fluids (Strong), Carbohydrate loading - reduced preoperative insulin resistance (Strong)

**Pre-anesthetic medication**

**ERASAlberta Recommendation**: Patients should not routinely receive long acting sedative medication before surgery.

• **ERAS® Society Recommendation**: Patients should not routinely receive long or short acting sedative medication before surgery because it delays immediate postoperative recovery. No advantages in using long-acting benzodiazepines. Short-acting benzodiazepines can be used in young patients before potentially painful interventions (insertion of spinal or epidural, arterial catheter), but they should not be used in the elderly (age >60 years).

• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (High); Rectal Surgery (Moderate)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Strong)

**Venous thromboembolism prophylaxis**

**ERASAlberta Recommendation**: Patients should have a sequential compression device (SCD) applied, and receive preoperative or intraoperative pharmacological prophylaxis with heparin. Extended prophylaxis with low molecular weight heparin (LMWH) should be given for an additional 28 days post discharge to patients with cancer or other patients with increased risk of venous thromboembolism (VTE).

• **ERAS® Society Recommendation**: Patients should wear well-fitting compression stockings, have intermittent pneumatic compression, and receive pharmacological prophylaxis with LMWH. Extended prophylaxis for 28 days should be given to patients with colorectal cancer or other patients with increased risk of VTE.

• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (High); Rectal Surgery (High)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Strong)

**Antimicrobial prophylaxis and skin preparation**

**ERASAlberta Recommendation**: Same as the ERAS® Society recommendation below with antibiotic provision as per [Bugs & Drugs](#).

• **ERAS® Society Recommendation**: Routine prophylaxis using intravenous antibiotics should be given 30 to 60 minutes before initiating surgery in a single dose. Additional doses should be given during prolonged operations according to half-life of the drug
used. A recent randomized control trial has shown that skin preparation with a scrub of chlorhexidine-alcohol is superior to povidone-iodine in preventing surgical-site infections\textsuperscript{9}. Preparation with chlorhexidine-alcohol should be used.

- **ERAS\textsuperscript{®} Society Recommendation - Quality of Evidence**: Colon Surgery (High); Rectal Surgery: Antimicrobial prophylaxis (High), Chlorhexidine-alcohol skin preparation (Moderate)
- **ERAS\textsuperscript{®} Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery: Antimicrobial prophylaxis (Strong), Skin preparation (Strong), Chlorhexidine-alcohol skin preparation (Weak)

**Prevention of postoperative nausea and vomiting (PONV)**

**ERAS\textsuperscript{Alberta Recommendation}**: All patients need to be preoperatively assessed for risk\textsuperscript{10} and provided with perioperative PONV prophylaxis accordingly. A multimodal approach to PONV prophylaxis should be adopted in all high risk patients.\textsuperscript{11}

- **ERAS\textsuperscript{®} Society Recommendation**: A multimodal approach to PONV prophylaxis should be adopted in all patients with $\geq 2$ risk factors undergoing major colorectal surgery. If PONV is present, treatment should be given using a multimodal approach.
- **ERAS\textsuperscript{®} Society Recommendation - Quality of Evidence**: Colon Surgery (Low); Rectal Surgery: High risk patients (High), All patients (Low)
- **ERAS\textsuperscript{®} Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Strong)

**Standard anesthetic protocol**

**ERAS\textsuperscript{Alberta Recommendation}**: Emphasis is placed on using short acting anesthetic agents with consideration for the use of total intravenous anesthesia (TIVA) instead of inhalation anesthetic. Opioids should be used sparingly and if needed, short acting opioids are recommended.

- **ERAS\textsuperscript{®} Society Recommendation**: To attenuate the surgical stress response, intraoperative maintenance of adequate hemodynamic control, central and peripheral oxygenation, muscle relaxation, depth of anesthesia, and appropriate analgesia is strongly recommended. A standard anesthetic protocol allowing rapid awakening should be given. The anesthetist should control fluid therapy, analgesia and hemodynamic changes to reduce the metabolic stress response. Open surgery: mid-thoracic epidural blocks using local anesthetics and low dose opioids. Laparoscopic surgery: spinal analgesia or morphine patient controlled analgesia (PCA) is an alternative to epidural anesthesia.
- **ERAS\textsuperscript{®} Society Recommendation - Quality of Evidence**: Colon Surgery: Rapid awakening (Low), Reduce stress response ( Moderate), Open surgery (High), Laparoscopic surgery (Low); Rectal Surgery: Epidural (Moderate), IV Lidocaine (Low), Remifentanil (Low), High oxygen concentration (High)
- **ERAS\textsuperscript{®} Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery: Epidural (Strong), IV Lidocaine (Weak), Remifentanil (Strong), High oxygen concentration (Strong)

**Prevention of intraoperative hypothermia**

**ERAS\textsuperscript{Alberta Recommendation}**: Same as the ERAS\textsuperscript{®} Society recommendation below.
• **ERAS® Society Recommendation:** Intraoperative maintenance of normothermia with a suitable warming device and warmed intravenous fluids should be used routinely to keep body temperature >36°C. Attempts should be made to avoid hypothermia because it increases the risk of perioperative complications.

• **ERAS® Society Recommendation - Quality of Evidence:** Colon Surgery (High); Rectal Surgery (High)

• **ERAS® Society Recommendation - Strength of Recommendation:** Colon Surgery (Strong); Rectal Surgery (Strong)

**Perioperative fluid management**

**ERASAlberta Recommendation:** Very restrictive or liberal fluid regimes should be avoided in favor of euvolemia. The use of advanced hemodynamic monitoring to facilitate individualized fluid therapy during the perioperative period should be considered, especially for high risk patients and patients for which significant intravascular volume loss is anticipated. Balanced crystalloid solutions are preferred to sodium chloride 0.9%. The enteral route for fluid postoperatively should be used as early as possible, and intravenous fluids should be discontinued as soon as is practically appropriate.

• **ERAS® Society Recommendation:** Patients should receive intraoperative fluids (colloids and crystalloids) guided by flow measurements to optimize cardiac output. Fluid balance should be optimized by targeting cardiac output and avoiding overhydration. Targeted fluid therapy using the esophageal Doppler system is recommended. Vasopressors should be considered for intra- and postoperative management of epidural-induced hypotension provided the patient is normovolemic. The enteral route for fluid postoperatively should be used as early as possible, and intravenous fluids should be discontinued as soon as is practicable.

• **ERAS® Society Recommendation - Quality of Evidence:** Colon Surgery: Balanced crystalloids (High), Flow measurement in open surgery (High), Flow measurement in other patients (Moderate), Vasopressors (High), Early enteral route (High); Rectal Surgery (Moderate)

• **ERAS® Society Recommendation - Strength of Recommendation:** Colon Surgery (Strong); Rectal Surgery (Strong)

**Minimally invasive surgery**

**ERASAlberta Recommendation:** Minimally invasive surgery (MIS) is recommended for appropriate patients when expertise and resources are available.

• **ERAS® Society Recommendation:** Laparoscopic surgery for colonic resections is recommended if the expertise is available. With proven safety and at least equivocal disease-specific outcomes, laparoscopic proctectomy and proctocolectomy for benign disease can be carried out by an experienced surgeon within an ERAS protocol with the goals of reduced perioperative stress (manifested by decreased postoperative ileus), decreased length of stay in hospital (LOS), and fewer overall complications. Laparoscopic resection of rectal cancer is currently not generally recommended outside of a trial setting (or specialized centre with ongoing audit) until equivalent oncologic outcomes are proven.
• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery: Oncology (High), Morbidity (Low), Recovery/LOS (Moderate); Rectal Surgery: Laparoscopic resection of benign disease (Low), Laparoscopic resection of rectal cancer (Moderate)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Strong)

### Nasogastric intubation

**ERASAlberta Recommendation**: Same as the ERAS® Society recommendation below.

• **ERAS® Society Recommendation**: Postoperative nasogastric tubes should not be used routinely. Nasogastric tubes inserted during surgery should be removed before reversal of anaesthesia.

• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (High); Rectal Surgery (High)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Strong)

### Surgical site drains

**ERASAlberta Recommendation**: Same as the ERAS® Society recommendation below.

• **ERAS® Society Recommendation**: Routine drainage is discouraged because it is an unsupported intervention that is likely to impair mobilization.

• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (High); Rectal Surgery (Low)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Weak)

### Urinary drainage

**ERASAlberta Recommendation**: Urinary catheter removal should be considered upon completion of procedure, if appropriate. If required for postoperative bladder drainage, it should be used for a short period only, and removal within 1 to 2 days is recommended. The urinary catheter should be removed regardless of the usage or duration of thoracic epidural analgesia (TEA).

• **ERAS® Society Recommendation**: Routine transurethral bladder drainage for 1 to 2 days is recommended. The bladder catheter can be removed regardless of the usage or duration of TEA. After pelvic surgery with a low estimated risk of postoperative urinary retention, the transurethral bladder catheter may be safely removed on postoperative day 1, even if epidural analgesia is used. In patients with an increased risk of prolonged postoperative urinary retention, placement of a suprapubic catheter is recommended.

• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (Low); Rectal Surgery: Transurethral catheter (Low), Suprapubic prolonged catheterization (Low)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery: Routine bladder drainage (Strong), Early removal if epidural used (Weak); Rectal Surgery: Transurethral catheter (Weak), Suprapubic prolonged catheterization (Weak)
Prevention of postoperative ileus

ERAS® Alberta Recommendation: Same as the ERAS® Society recommendation below with the following exception: thoracic epidural analgesia (TEA) or laparoscopic surgery should be utilized in colonic surgery if possible. Note: Alvimopan is not available in Canada.

- **ERAS® Society Recommendation**: Mid-thoracic epidural analgesia and laparoscopic surgery should be utilized in colonic surgery if possible. Fluid overload and nasogastric decompression should be avoided. Chewing gum can be recommended, whereas oral magnesium and alvimopan may be included. A multimodal approach to optimizing gut function after rectal resection should involve chewing gum and oral laxatives.

- **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery: Thoracic epidural and laparoscopy (High), Chewing gum (Moderate), Oral magnesium, Alvimopan (Low); Rectal Surgery: Chewing gum (Moderate), Oral laxatives (Low)

- **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery: Thoracic epidural, fluid overload, nasogastric decompression, chewing gum, alvimopan (Strong), Oral magnesium (Weak); Rectal Surgery: Chewing gum (Strong), Oral laxatives (Weak)

Postoperative analgesia

ERAS® Alberta Recommendation: The use of multimodal opioid-sparing strategies is recommended. Appropriately placed thoracic epidural analgesia (TEA) using local anesthetics and low dose opioids should be considered for open surgery.

- **ERAS® Society Recommendation**: Open surgery: Thoracic epidural analgesia (TEA) using low-dose local anesthetic and opioids. Laparoscopic surgery: An alternative to TEA is a carefully administered spinal analgesia with a low dose, long-acting opioid TEA. TEA is recommended for open rectal surgery for 48 to 72 hours in view of the superior quality of pain relief compared with systemic opioids. Intravenous (IV) administration of lidocaine has also been shown to provide satisfactory analgesia, but the evidence in rectal surgery is lacking. If a laparoscopic approach is used, epidural or intravenous lidocaine, in the context of ERAS, provides adequate pain relief and no difference in the duration of length of stay in hospital (LOSH) and return of bowel function. Rectal pain can be of neuropathic origin, and needs to be treated with multimodal analgesic methods. There is limited evidence for the routine use of wound catheters and continuous transversus abdominis plane (TAP) blocks in rectal surgery.

- **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery: TEA open surgery (High), Local anesthetic and opioid (Moderate), TEA not mandatory in laparoscopic surgery (Moderate); Rectal Surgery: Epidural for open surgery (High), Epidural for laparoscopy (Low), IV lidocaine (Moderate), Wound infiltration and TAP blocks (Low)

- **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery: Epidural for open surgery (Strong), Epidural for laparoscopy (Weak), IV lidocaine (Weak), Wound infiltration and TAP blocks (Weak)

Postoperative glucose control

ERAS® Alberta Recommendation: Same as the ERAS® Society recommendation below.
Note: The Provincial Clinical Knowledge Topic: Perioperative Diabetes Management is under development and will further inform the ERASAlberta recommendation.

- **ERAS® Society Recommendation**: Hyperglycemia is a risk factor for complications and should therefore be avoided. Several interventions in the ERAS protocol affect insulin action/resistance, thereby improving glycemic control with no risk of causing hypoglycemia. For ward-based patients, insulin should be used judiciously to maintain blood glucose as low as feasible with the available resources. Maintenance of perioperative blood sugar levels within an expert-defined range results in better outcomes. Therefore, insulin resistance and hyperglycemia should be avoided using stress-reducing measures or if already established by active treatment. The level of glycemia to target for intervention at the ward level remains uncertain, and is dependent upon local safety aspects.

- **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery: Using stress-reducing elements of ERAS to minimize hyperglycemia (Low), Insulin treatment in the Intensive Care Unit (ICU) (Moderate), Glycemic control in ward setting (Low); Rectal Surgery: Use stress-reducing measures (Moderate), Level of glycemia for insulin treatment (Low)

- **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery: Using stress-reducing elements of ERAS to minimize hyperglycemia (Strong), Insulin treatment in ICU - severe hyperglycemia (Strong), Insulin treatment in ICU - mild hyperglycemia (Weak), Insulin treatment in ward setting (Weak); Rectal Surgery: Use of stress-reducing treatments (Strong), Insulin treatment (non-diabetics) at the ward level (Weak)

**Postoperative nutritional care**

**ERASAlberta Recommendation**: Same as the ERAS® Society recommendation below with the following exception: ERASAlberta recommends a Post-Surgical Transition Diet.

- **ERAS® Society Recommendation**: Patients should be screened for nutritional status and if at risk of under nutrition given active nutritional support. Perioperative fasting should be minimized. Postoperatively patients should be encouraged to take normal food as soon as lucid after surgery. In addition to normal food intake, patients should be offered oral nutrition supplements (ONS) to maintain adequate intake of protein and energy. An oral ad libitum diet is recommended 4 hours after rectal surgery.

- **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery: Postoperative early enteral feeding - safety (High), Improved recovery and reduction of morbidity (Low), Perioperative ONS – well-fed patient (Low), Perioperative ONS – malnourished patient (Low), Immunonutrition (IN) (Low) Rectal Surgery: Early oral intake (Moderate), ONS (Low)

- **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery: Postoperative early feeding and perioperative ONS (Strong), IN could be considered in open colonic resections (Weak); Rectal Surgery: Early oral intake (Strong), ONS (Strong)

**Early mobilization**

**ERASAlberta Recommendation**: Same as the ERAS® Society recommendation below. Note: Mobilization to start the evening of postoperative day 0.
• **ERAS® Society Recommendation**: Prolonged immobilization increases the risk of pneumonia, insulin resistance and muscle weakness. Patients should therefore be mobilized. Patients should be nursed in an environment that encourages independence and mobilization. A care plan that facilitates patients being out of bed for 2 hours on the day of surgery and 6 hours thereafter is recommended

• **ERAS® Society Recommendation - Quality of Evidence**: Colon Surgery (Low); Rectal Surgery (Low)

• **ERAS® Society Recommendation - Strength of Recommendation**: Colon Surgery (Strong); Rectal Surgery (Strong)

**Audit outcomes and compliance**

**ERAS® Society Recommendation**: A systematic audit is essential to determine clinical outcomes and measure overall compliance with clinical recommendations. Reporting on patient experience and functional recovery using validated tools may also be useful. Using more evidence-based elements of perioperative care from an ERAS guideline are likely to improve outcomes further.

• **ERAS® Society Recommendation**: None

• **ERAS® Society Recommendation - Quality of Evidence**: N/A

• **ERAS® Society Recommendation - Strength of Recommendation**: N/A

**Clinical Decision Support**

The ERAS Colorectal Surgery, Adult - Inpatient Topic is intended to guide clinicians in enhancing surgical care for all patients who meet the inclusion criteria for the ERAS clinical care pathway. The ERAS clinical knowledge and patient information contained within this Topic are intended to be used as a comprehensive package applied to a surgical care population. All recommendations should be applied to all eligible patients. The anticipated benefits of care management are reduced if the clinical care pathway is applied selectively.

Clinical decision support tools relevant to the ERAS Colorectal Surgery, Adult - Inpatient clinical care pathway include the following

**AHS Eating and Drinking Before Surgery: Patient Instructions**

**AHS Eating and Drinking Before Surgery with Bowel Preparation: Patient Instructions**

Canadian Nutrition Screening Tool (CNST) - Appendix A

**Choosing Wisely Canada: Drop the Pre-Op Toolkit**

**Canadian Anesthesiologists’ Society Guidelines to the Practice of Anesthesia - Revised Edition 2018**

**AHS Venous Thromboembolism Prophylaxis Guideline**

**Bugs & Drugs**
Consensus Guidelines for the Management of Postoperative Nausea and Vomiting

AHS Use of Aprepitant (Emend®) for Prevention of Postoperative Nausea and Vomiting (PONV) in Adults

Choosing Wisely Canada: Recommendations and Resources, by Specialty

Other important clinical information relevant to the ERAS Colorectal Surgery, Adult - Inpatient clinical care pathway can be found in References and Additional Information.

ERAS Colorectal Surgery, Adult – Inpatient Preoperative Order Set

Order Set Components

Order Set Keywords: ERAS, Colorectal, Preadmission, Preoperative, Surgery

Admit, Transfer, Discharge

☐ Anticipated Date of Discharge:

Patient Teaching

✓ Teach: provide ERAS patient teaching material and discuss perioperative patient goals
  • On the Road to Your Recovery: A Patient’s Guide to ERAS (link to be added once available; please contact ERASAlberta@AHS.ca to request)

☐ Teach: provide AHS Eating and Drinking Before Surgery: Patient Instructions
☐ Teach: provide AHS Eating and Drinking Before Surgery with Bowel Preparation: Patient Instructions

☐ Teach: provide bowel preparation instructions
☐ Teach: provide site-specific patient material
☐ Teach: review current medications for stop/continue/hold (e.g., anticoagulants)

Consults and Referrals

☐ Physician Consult: Anesthesia
☐ Physician Consult: Internal Medicine

If a stoma is anticipated choose Enterostomal Therapy Nurse:
☐ Enterostomal Therapy Nurse Referral

If Canadian Nutrition Screening Tool (CNST) – Appendix A score equals 2 Yes answers choose Dietitian Referral:
☐ Dietitian Referral

Laboratory Investigations (refer to Choosing Wisely Canada: Drop the Pre-Op Toolkit)

☐ Complete Blood Count (CBC)
☐ PT INR
☐ PTT
☐ Albumin
☐ ALP
☐ ALT
- AST
- Bilirubin Total
- Creatinine/eGFR
- Electrolytes (Na, K, Cl, CO₂)
- Hemoglobin A1C
- Total Protein

*If patient has diabetes choose Blood Glucose Monitoring point-of-care testing (POCT):*
- Blood Glucose Monitoring POCT: AM of surgery

**Tumour Markers**
- CEA
- Type and Screen

**Diagnostic Investigations** *(refer to Choosing Wisely Canada: Drop the Pre-Op Toolkit)*
- GR Chest, 2 Projections (Chest X-Ray PA and Lateral)
- Electrocardiogram

**Bowel Preparation**
- No bowel preparation
- Prescription provided to patient for Bowel Preparation with Oral Antibiotics

  **Bowel Preparation Options**
  - polyethylene glycol/electrolytes (CoLyte®) 4 L PO the day prior to surgery as per instructions
  - PICO-SALAX® (contains 2 packets) and 4 bisaCODyl tablets as per instructions
  - Bi-PegLyte® Prep Kit (contains 2 packets of polyethylene glycol 3350 and electrolytes, and 3 bisaCODyl tablets) the day prior to surgery as per instructions

**Oral Antibiotic Option**
- Neomycin is a compounded product that is not routinely available from all community pharmacies. Community pharmacies may require a few business days to obtain neomycin or may refer the patient to a compounding pharmacy. AHS is unable to assist in obtaining this medication for outpatient or inpatient use.
  - neomycin 1 g PO at 1300, 1500 and 2000 hours the day prior to surgery and
  - metroNIDAZOLE 1 g PO at 1300, 1500 and 2000 hours the day prior to surgery

- Prescription provided to patient for phosphate enema (Fleet®) the evening prior to surgery
- phosphate enema (Fleet®) 130 mL RECTALLY the morning of surgery

**Diet** *(refer to page 83 of Canadian Anesthesiologists’ Society Guidelines to the Practice of Anesthesia - Revised Edition 2018)*
- Assess the timing of the last light meal and last clear fluids. The minimum duration of preoperative fasting prior to the administration of anesthesia should be
  - 8 hours after a meal that includes meat or fried or fatty foods
  - 6 hours after a light meal (such as toast and a clear fluid)
  - 2 hours after clear fluids
If the patient has not received their carbohydrate load treatment between 2 and 3 hours prior to the scheduled surgery time, choose Carbohydrate Load Treatment (refer to ERAS Consensus Statement for Anaesthesia Practice and Juice as Carbohydrate Loading Products – Appendix B).

- Carbohydrate Load Treatment: clear juice (either cranberry cocktail or apple juice) 500mL PO, between 2 and 3 hours prior to the administration of anesthesia

**Intravenous Therapy**

- Intravenous Cannula: insert in Operating Room (recommended)
- Intravenous Cannula: insert in day surgery area, apply saline lock
- Intravenous Cannula: insert in day surgery area, use infusion pump and lactated ringer’s infusion IV at no greater than 30 mL/hour

**Medications**

**VTE Prophylaxis** (refer to AHS Venous Thromboembolism Prophylaxis Policy and Guideline)

Consider dose adjustment in patients with reduced renal function or extremes of weight.

- heparin 5000 units SUBCUTANEOUSLY once preoperatively or to be given in Operating Room as per local institutional practices, recommended to be given after epidural insertion, if applicable

**Antibiotic Prophylaxis**

Refer to Bugs & Drugs for specific antibiotic recommendations based on surgery type and clinical indications. Antibiotics should be given within 60 minutes of incision and be fully infused prior to skin incision.

Choose BOTH:

- ceFAZolin 2 g IV push once preoperatively
- metroNIDAZOLE 500 mg IV once, administer over 20 minutes just prior to the procedure

OR

If patient has severe cefazolin allergy choose BOTH:

- gentamicin (1.5 mg/kg) ______ mg IV once, administer over 30 minutes just prior to procedure

AND

- clindamycin 600 mg IV once, administer over 20 minutes just prior to procedure

OR

If patient is at increased risk of resistance (e.g., E. coli cefazolin susceptibility less than 80%, patient hospitalized 3 or more days, antibiotic therapy in last 6 months, recent international travel) choose BOTH:

- cefTRIAxone 2 g IV push once preoperatively

AND

- metroNIDAZOLE 500 mg IV once, administer over 20 minutes just prior to the procedure

**Analgesics**

- acetaminophen 1000 mg PO once preoperatively, to be given 1 hour prior to surgery
- gabapentin 300 mg PO once preoperatively, to be given 1 hour prior to surgery
Use caution for patients with renal impairment, those at high risk of acute kidney injury, and those with an increased risk of anastomotic leak especially when low rectal anastomosis is anticipated.

- ibuprofen 400 mg PO once preoperatively, to be given 1 hour prior to surgery

OR

If patient has proven history of ulcers or complicated perforation, obstruction, or major bleeding choose celecoxib:

- celecoxib 400 mg PO once preoperatively, to be given 1 hour prior to surgery

Antiemetics (refer to Consensus Guidelines for the Management of Postoperative Nausea and Vomiting\(^1\))

- Assess the patient and determine their simplified risk score from Apfel et al.\(^10\) to predict their risk for developing postoperative nausea and vomiting (PONV)

  - If PONV risk score is 0 or 1 consider no prophylaxis:
    - PONV prophylaxis not required
  
  - If PONV risk score is 2 consider ondansetron:
    - ondansetron 4 mg PO once preoperatively, to be given 1 hour prior to surgery

  - If PONV risk score is 3 or greater use a multi-modal approach with at least one preoperative antiemetic and additional intraoperative antiemetics. If the patient meets AHS restrictions for PONV prophylaxis with aprepitant using AHS Use of Aprepitant (Emend) for Prevention of PONV in Adults choose aprepitant:
    - aprepitant 80 mg PO once preoperatively, to be given 1 hour prior to surgery

  - If PONV risk score is 3 or greater use a multi-modal approach with at least one preoperative antiemetic and additional intraoperative antiemetics. If the patient does not meet AHS restrictions for PONV prophylaxis with aprepatiant choose ondansetron:
    - ondansetron 4 mg PO once preoperatively, to be given 1 hour prior to surgery

Other Medications

- Do not order/give anticoagulants _______ days prior to surgery

Patient Care

- Goals of Care Designation (refer to AHS Advance Care Planning & Goals of Care Designation Policy and Procedure)
- Antibiotic Resistant Organism (ARO) Screen as per local institutional practices
- Apply sequential compression device (SCD)
- Apply graduated compression stockings
- Apply forced-air warming device (e.g., Bair Hugger, Bair Paws)

ERAS Colorectal Surgery, Adult – Inpatient Intraoperative Orders Set

Order Set Components

Order Set Keywords: ERAS, Colorectal, Intraoperative, Anesthesia, Surgery
Patient Care
- Apply sequential compression device (SCD)
- Apply forced-air warming device (e.g., Bair Hugger, Bair Paws)

Normothermia
- Temperature: maintain normothermia
  - Operating Room temperature at least 20°C
  - Forced-air warming device used for all procedures lasting longer than 30 minutes to achieve/maintain a temperature between 36 to 38°C throughout the perioperative period
  - Measure and document patient’s temperature intraoperatively
  - Fluid warmers used for procedures in which greater than 1 litre fluid is expected to be administered

Postoperative Nausea and Vomiting (PONV) prophylaxis (refer to Consensus Guidelines for the Management of Postoperative Nausea and Vomiting11)
- Provide multimodal prophylaxis with consideration to patient’s PONV risk score and administration of preoperative PONV prophylaxis

Pain Management
- Consider the use of regional anesthesia (transversus abdominis plane [TAP] block, rectus sheath block) or thoracic epidural analgesia (TEA) if applicable, and discuss decision with surgical team
- Use opioids sparingly. If needed, short acting opioids are recommended. Long acting opioids should be avoided. Patients with preoperative chronic pain may require additional assessment based on their best possible medication history (BPMH). Consider non-opioid analgesia or appropriate opioid-sparing adjuncts

ERAS Guidance
- Consider the use of total intravenous anesthesia (TIVA) instead of inhalation anesthetic
- Avoid routine nasogastric intubation
- Fluid therapy goal is to maintain euvolemia. If appropriate, use goal-directed fluid management to guide fluid therapy especially for high risk patients and for patients undergoing surgery with significant intravascular volume losses anticipated
- Avoid use of surgical site drains
- Remove indwelling urinary catheter upon completion of procedure, if applicable

ERAS Colorectal Surgery, Adult – Inpatient Postoperative Orders Set

Order Set Components
Order Set Keywords: ERAS, Colorectal, Postoperative, Surgery

Admit, Transfer, Discharge
- Anticipated Date of Discharge: _____________________________________
Patient Care

- **Goals of Care Designation** (refer to [AHS Advance Care Planning & Goals of Care Designation Policy and Procedure](#))
- Apply sequential compression device (SCD), discontinue when ambulating well
- Apply graduated compression stockings, discontinue when ambulating well
- **Wound Dressing Instructions:**

**Monitoring**

- Postoperative Vital Signs: assess as per local institutional practices
- Opioid Monitoring: monitor as per local institutional practices
- Pain Score and Nausea Score: assess at least every 4 hours x 3 days and then every 8 hours, attempt to maintain pain score less than 4/10 and nausea score less than 2/10
- Intake and Output: assess every 8 hours x 4 days, include strict oral intake
- Patient Weight: assess daily x 3 days, start on postoperative day (POD) 1
- Surgical Incisions: assess every 8 hours and PRN
- Active Suction Drain(s) (e.g., Jackson-Pratt): reprime every 8 hours and PRN, record output
- Indwelling Urinary Catheter (e.g., Foley): remove on POD 1 in AM

*For low anterior resection and abdominoperineal resection consider removal on POD 2:*
- Indwelling Urinary Catheter: remove on POD 2 in AM

- In and Out Urinary Catheter: insert PRN (for urinary retention) if post-residual void is greater than 400 to 600 mL or patient is uncomfortable
- Indwelling Urinary Catheter: insert if in and out urinary catheter is required twice. Notify most responsible health practitioner

**Respiratory Care**

- Incentive Spirometry: perform every 1 hour while awake
- Oxygen Therapy: titrate to saturation, maintain SpO₂ greater than 92%
- Head of Bed: elevate to at least 30° while patient on opioids or epidural

**Intravenous Therapy**

*Fluid therapy goal is to maintain euvoled. Urine output, blood pressure, heart rate and patient’s mental status are all indicators of patient volume status.*

Choose ONE:
- lactated ringer’s infusion IV at 30 to 75 mL/hour, stop when drinking well (when patient tolerates 800 mL oral intake)
- potassium chloride 20 mmol in dextrose 5% (D5W) – sodium chloride 0.45% infusion IV at 30 to 75 mL/hour, stop when drinking well (when patient tolerates 800 mL oral intake)

**Medications**

*Ensure best possible medication history (BPMH) and medication reconciliation completed. In hospital medications to be ordered by authorized prescriber.*

**VTE Prophylaxis** (refer to [AHS Venous Thromboembolism Prophylaxis Policy and Guideline](#))

*Patients undergoing abdominopelvic cancer surgery and those at increased risk of VTE should be considered for extended prophylaxis (up to 4 weeks post discharge) with low molecular weight heparin (LMWH).*
Follow orders for AHS VTE Prophylaxis Adult Patient Care, administer every 24 hours, start evening of POD 0

Gastrointestinal Prophylaxis
If patient is at risk for increased acid production choose ONE:
- pantoprazole EC tab 40 mg PO daily before breakfast until discharge
- ranitidine 150 mg PO BID until discharge

Bowel Stimulation
- Chew gum 3 times daily (minimum 30 minutes each time), as tolerated
  Choose ONE:
  - magnesium gluconate 1000 mg PO BiD, start on POD 1 and discontinue after first bowel movement
  - magnesium hydroxide 30 mL PO BiD, start on POD 1 and discontinue after first bowel movement

Analgesics
Use opioid-sparing multimodal analgesia. If needed, short acting opioids are recommended. Long acting opioids should be avoided except in the context of individual clinical circumstances. Consider non-opioid analgesia or appropriate opioid-sparing adjuncts. Attempt to maintain pain score less than 4/10.
- Follow orders for continuous regional epidural. Refer to local institutional practices until provincial orders available
- Follow orders for patient controlled analgesia (PCA). Refer to local institutional practices until provincial orders available

Prophylaxis Analgesics
Use caution to ensure acetaminophen from all sources does not exceed 4000 mg per 24 hours.
- acetaminophen 1000 mg PO every 6 hours x 48 hours and then acetaminophen 1000 mg PO every 6 hours PRN for pain to a maximum of 4000 mg acetaminophen per 24 hours from all sources
  Choose ONE:
  - ibuprofen 400 mg PO every 6 hours x 48 hours and then ibuprofen 400 mg PO every 6 hours PRN for pain

  Use caution for patients with renal impairment, those at high risk of acute kidney injury, and those with an increased risk of anastomotic leak especially when low rectal anastomosis is anticipated.
- celecoxib 200 mg PO BiD for 48 hours and then BiD PRN for pain

  Use caution for patients with renal impairment, those at high risk of acute kidney injury, and those with an increased risk of anastomotic leak especially when low rectal anastomosis is anticipated.
- ketorolac 10 mg IV every 8 hours x 48 hours
If patient had open surgery without an epidural, long acting opioids may assist with pain control. Consider using only short acting opioids or the lowest possible dose of long acting opioid for an opioid sensitive or elderly patient.

☐ Other ________________________________

**PRN Oral Opioids** *(for pain not controlled by non-opioid analgesia)*  
Consider dose reduction in the elderly.  
Choose ONE:

☐ oxyCODONE 5 to 15 mg PO every 4 hours PRN for pain not controlled by non-opioid analgesia

*Use caution to ensure acetaminophen from all sources does not exceed 4000 mg per 24 hours.*

☐ traMADol/acetaminophen 37.5 mg/325 mg 1 to 2 tabs PO every 6 hours PRN for pain not controlled by non-opioid analgesia to a maximum of 4000 mg of acetaminophen per 24 hours from all sources

**PRN Parenteral Opioids** *(for pain not controlled by oral opioids, or oral analgesia is contraindicated)*  
Consider dose reduction in the elderly.  
Choose ONE:

☐ morphine ______ mg IV/SUBCUTANEOUSLY every ______ hour(s) PRN for pain not controlled by oral opioids

☐ HYDROmorphine ____ mg IV/SUBCUTANEOUSLY every ______ hour(s) PRN for pain not controlled by oral opioids

**Antiemetics** *(refer to Consensus Guidelines for the Management of Postoperative Nausea and Vomiting)*

☑ Nausea Score: assess with vital signs and prior to routine antiemetic administration, attempt to maintain nausea score less than 2/10

**Prophylaxis Antiemetics**  
Consider dose reduction in the elderly.

☐ ondansetron 4 mg PO/IV (or ODT if difficulty swallowing or active vomiting with no IV access) every 8 hours x 48 hours and then 4 to 8 mg every 8 hours PRN for nausea score greater than 2/10

**PRN Antiemetics** *(for PONV not controlled by prophylactic antiemetics)*  
Consider dose reduction in the elderly.

☐ metoclopramide 10 mg PO/IV/IM every 6 hours PRN for nausea score greater than 2/10

☐ dimenhyDRINATE 25 to 50 mg PO/IV/IM every 4 hours PRN for nausea score greater than 2/10

**Other Medications**

☐ Follow orders for AHS Basal Bolus Insulin Therapy (BBIT) and see Provincial Clinical Knowledge Topic: Basal Bolus Insulin Therapy, Adult – Inpatient

**Laboratory Investigations** *(refer to Choosing Wisely Canada: Pathology Recommendations)*

☐ Complete Blood Count (CBC) on POD 1 in AM and POD 3 in AM
Creatinine on POD 1 in AM and POD 3 in AM
Electrolytes (Na, K, Cl, CO₂) on POD 1 in AM and POD 3 in AM
Magnesium (Mg) on POD 1 in AM and POD 3 in AM
Urea on POD 1 in AM and POD 3 in AM

**Diet**
- Post-Surgical Transition Diet: start on POD 0
- Regular Diet: start on POD 2
- Regular Diabetic - Adult Diet: start on POD 2

*If patient has ostomy consider Low Fiber Diet:*
- Low Fiber Diet: start on POD 2
- Low Fiber Diabetic - Adult Diet: start on POD 2

**Protein/Calorie Dense Oral Nutrition Supplements**
Appropriate when patient is on any type of oral diet including Gluten Free and Diabetic – Adult.
Suitable for lactose intolerance but NOT appropriate for dairy allergy. Achieve a supplement intake of 300 kcal/day on POD 0 and 600 kcal/day on POD 1 until discharge.
- Ensure Enlive: 90 mL PO 3 times daily, start on POD 0 and then 90 mL PO 5 times daily, start on POD 1 until discharge

**Activity**
- Activity as tolerated with the following goals
  - POD 0: stand at bedside, up in chair, walk to doorway and back; activity goal is 2 hours
  - POD 1: up in chair for 1 hour each meal (breakfast, lunch and supper), ambulate at least 3 times daily (minimum 20 minutes each time); activity goal is 4 hours
  - POD 2 until discharge: up in chair for 1.5 hours each meal (breakfast, lunch and supper), ambulate at least 3 times daily (minimum 30 minutes each time); activity goal is 6 hours daily
- Assess for physiotherapy needs on POD 1. Notify physiotherapist if preoperative mobility concerns or if patient requires more than one-person assist

**Patient Teaching**
- Teach: implement LMWH teaching in preparation for home therapy, if applicable
- Teach: ostomy self-management, if applicable

**Consults and Referrals**
- Dietitian Referral
- Enterostomal Therapy Nurse Referral
- Physiotherapy Referral
- Social Work Referral
- Transition Services Referral

**Rural Considerations**
The ERAS clinical knowledge and patient information contained within each Topic are intended to be used as a comprehensive package to maximize the anticipated benefits of care management. Considerations for application of ERAS clinical care pathways (developed for
Breast Reconstruction, Colorectal, Cystectomy, Gynecologic Oncology, Liver, Major Gynecology, Major Head and Neck, and Pancreas surgery) in rural surgical facilities within Alberta include

- Surgical procedure criteria must be met (see the Rationale section in each ERAS Topic).
  - Adult inpatients scheduled for Breast Reconstruction, Colorectal, Cystectomy, Gynecologic Oncology, Liver, Major Gynecology, Major Head and Neck, or Pancreas surgery who do not meet the inclusion criteria for the ERAS clinical care pathway may still be considered for applicable recommendations of that pathway (see the Recommendations section in each ERAS Topic)
  - Adult inpatients scheduled for any other type of surgery may be considered for the Enhanced Recovery for all Surgeries, Adult - Inpatient clinical care pathway
- Clinical expertise (e.g., surgeon, anesthesia and nursing), clinical support services (e.g., nutrition, pharmacy, physiotherapy, laboratory, diagnostic imaging, physiotherapy), and additional resources (e.g., medications, nutrition supplements, sequential compression devices, active warming devices) are available for the duration of clinical care from admission to discharge (see the Recommendations section in each ERAS Topic)
  - There must also be site physician and operations leadership, a site team focused on learning and collaboration, and processes and resources to audit outcomes and compliance

Disposition Planning

Discharge
Prior to patient discharge from the ERAS clinical care pathway, the following should be considered

- Patient is medically stable
- Patient is functioning close to or at preoperative level for activities of daily living
- Patient is passing gas or stool
- Patient is tolerating solid food
- Patient’s pain is well controlled (pain score less than 4/10) on oral analgesia
- Patient’s nausea is well controlled (nausea score less than 2/10) with no vomiting
- Patient’s incisions and/or wounds are healing and managed with appropriate wound care products

- Discharge medication list and prescription(s) have been provided to patient
- Discharge teaching is complete and a copy has been provided to patient
- Transition Services/Home Care Services have been arranged, if required
- Wound care/negative-pressure wound therapy supplies have been arranged, if required

- Patient has been referred to the following education resources
  - On the Road to Your Recovery: A Patient’s Guide to ERAS (link to be added once available; please contact ERASAlberta@AHS.ca to request)
  - My Health Alberta
    - Patient Care Webpages including After Surgery and Incision Care After Surgery
    - Patient Care Handouts including Before and After Surgery - Adult - What to Expect at Home
- **Patient Care Videos** including Before and After Surgery – *Preventing Problems After Surgery*

Outpatient follow-up
- If applicable, patient to have staples removed in 7 to 10 days by family physician or in surgeon's clinic
- Patient to follow up with family physician or surgeon in 4 to 6 weeks

### Analytics

#### Outcome Measure #1

<table>
<thead>
<tr>
<th>Name of Measure</th>
<th>ERASAlberta coverage rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Number of surgeries performed that were identified as ERAS surgery divided by the total surgeries that were performed that were eligible, multiplied by 100. Calculated provincially, by zone, by site.</td>
</tr>
<tr>
<td>Rationale</td>
<td>Intended to measure the ability of ERASAlberta to provide enhanced recovery surgeries across the province, zone and sites.</td>
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</table>

#### Outcome Measure #2

<table>
<thead>
<tr>
<th>Name of Measure</th>
<th>ERASAlberta length of stay (LOS) rates</th>
</tr>
</thead>
</table>
| Definition       | Number of surgeries performed that were identified as ERAS surgery and resulted in  
- acute LOS less than or equal to acute LOS benchmark  
- ICU LOS less than or equal to ICU LOS benchmark  
- readmission LOS less than or equal to readmission LOS benchmark  
- total LOS less than or equal to total LOS benchmark  
divided by total surgeries performed that were identified as ERAS surgery, multiplied by 100. Calculated provincially, by zone, by site. |
| Rationale        | Demonstrates how ERAS impacts patient care by decreasing postoperative complications and accelerating recovery, thereby allowing for earlier discharge. |

#### Outcome Measure #3

<table>
<thead>
<tr>
<th>Name of Measure</th>
<th>ERASAlberta readmission rate</th>
</tr>
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<tbody>
<tr>
<td>Definition</td>
<td>Number of surgeries performed that were identified as ERAS surgery and resulted in greater than or equal to 1 unplanned readmission to acute care within 30 days of discharge date divided by total surgeries performed that were identified as ERAS surgery, multiplied by 100. Calculated provincially, by zone, by site.</td>
</tr>
<tr>
<td>Rationale</td>
<td>Demonstrates how ERAS impacts patient care by decreasing postoperative complications and accelerating recovery, thereby reducing the risk of readmission.</td>
</tr>
<tr>
<td>Name of Measure</td>
<td>ERASAlberta compliance rates</td>
</tr>
<tr>
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<td>-----------------------------</td>
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<tr>
<td><strong>Definition</strong></td>
<td>Number of surgeries performed that were identified as ERAS surgery in which specific</td>
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<td></td>
<td>• ERAS preoperative care</td>
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<tr>
<td></td>
<td>• ERAS intraoperative care</td>
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<tr>
<td></td>
<td>• ERAS postoperative care</td>
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<tr>
<td></td>
<td>was provided in compliance with ERAS recommendations divided by total surgeries performed that were identified as ERAS surgery, multiplied by 100. Calculated by site.</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>Compliance with ERAS recommendations is an indicator of the appropriateness of the ERAS clinical care pathway in achieving desired patient outcomes.</td>
</tr>
</tbody>
</table>
References


Additional Information

AHS Advance Care Planning and Goals of Care Designation Policy:

AHS Advance Care Planning and Goals of Care Designation Procedure:

AHS Basal Bolus Insulin Therapy (BBIT):
https://www.albertahealthservices.ca/scns/Page12948.aspx

AHS Eating and Drinking Before Surgery: Patient Instructions

AHS Eating and Drinking Before Surgery with Bowel Preparation: Patient Instructions

AHS Enhanced Recovery after Surgery (ERAS):
http://www.albertahealthservices.ca/scns/page10959.aspx

AHS Knowledge Resource Service ERAS Subject Guide: Surgery Subject Guide:
http://krs.libguides.com/c.php?g=64393&p=414597#s-lg-box-wrapper-15089592

AHS Safe Surgery Checklist:

AHS Safe Surgery Checklist Policy:

AHS Use of Aprepitant (Emend®) for Prevention of Postoperative Nausea and Vomiting (PONV) in Adults:
http://insite.albertahealthservices.ca/PharmacyServices/tms-phm-aprepitant-summary.pdf

AHS Venous Thromboembolism Prophylaxis Guideline:

AHS Venous Thromboembolism Prophylaxis Policy:
AHS VTE Prophylaxis Adult Patient Care Orders, Physician’s Orders:

Bugs & Drugs:
http://www.bugsanddrugs.org

Canadian Nutrition Screening Tool (CNST):

Choosing Wisely Canada: Drop the Pre-Op Toolkit:
https://choosingwiselycanada.org/perspective/preop-toolkit/

Choosing Wisely Canada Recommendations and Resources, by Specialty:
https://choosingwiselycanada.org/recommendations/

MyHealth.Alberta.ca Health Information and Tools, Patient Care Handouts:
https://myhealth.alberta.ca/health/aftercareinformation/Pages/default.aspx

MyHealth.Alberta.ca Health Information and Tools, Surgery – What to Expect:
https://myhealth.alberta.ca/health/Pages/conditions.aspx?hwid=tw9795

https://myhealth.alberta.ca/health/Pages/healthvideoplayer.aspx

Provincial Clinical Knowledge Topic: Basal Bolus Insulin Therapy, Adult – Inpatient

Safer Healthcare Now! Prevent Surgical Site Infections:

Safer Healthcare Now! Venous Thromboembolism Prevention – Evidence-Based Appropriate VTE Prophylaxis:
Appendix A – Canadian Nutrition Screening Tool (CNST)

Note: Collaboration between patient care units and Nutrition Services is required as interventions may vary at site level.

Figure #2 Canadian Nutrition Screening Tool (CNST)

Canadian Nutrition Screening Tool (CNST)

- Date: __________
- Weight: _______
- Patient Phone #: ______
- Clinic / Unit: ______

Identify patients who are at risk for malnutrition
Ask the patient the following questions:

Have you lost weight in the past 6 months without trying to lose this weight?
(If the patient reports a weight loss but gained it back, consider it as a NO weight loss)
- YES
- NO

Have you been eating less than usual for more than a week?
- YES
- NO

Two “YES” answers indicate nutrition risk.
Patients at nutrition risk need an assessment to confirm malnutrition. Refer to a Registered Dietitian.

Sign initials once referral sent: _______________________

Comments (optional):

* If the patient is unable to answer the questions, a knowledgeable informant can be used to obtain the information. If the patient is uncertain regarding weight loss, ask if clothing is now fitting more loosely.
Appendix B – AHS ERAS Nutrition Working Group Consensus: Juice as Carbohydrate Loading Products

Background:
Drawing from the best practices around the world, ERAS is being implemented in Alberta to enhance perioperative patient care, support patient recovery and reduce health care costs. Carbohydrate loading is one of seventeen ERAS components and is an integral part of preoperative care process. The main purpose is to attenuate postoperative insulin resistance, which contributes to negative nitrogen balance, leading to muscle mass loss and reduced muscle strength. In addition, carbohydrate loading hinders preoperative stress, hunger and thirst in surgical patients. According to ERAS guidelines, carbohydrate loading involves ingestion of commercially available clear fluid containing 12% concentration of complex carbohydrates. These products have been extensively researched and are recommended for use by ERAS guidelines.

Carbohydrate-rich beverages such as Nutricia PreOp®, Roosvicee Original Fruitmix® and Vitajoule® have been evaluated in clinical trials in an array of surgery patients. ERAS and The European Society of Anaesthesiology Guidelines recommend the ingestion of carbohydrate-rich drinks that were specifically developed for preoperative consumption up to two hours before surgery. No specific guidelines were given regarding the type and/or brand of products to be used, however it was suggested that not all carbohydrates were safe. Gastric emptying is the major concern preoperatively, therefore beverages with lower osmolality assumed to be safer for preoperative consumption. In addition, it was suggested that the insulin response to the beverage should reach 60 μIU/mL to achieve appropriate fed state that is believed to improve postoperative insulin resistance. Most research that has been done involve only commercial products. Clinical studies proposed that 12.5% maltodextrin CHO-rich drink (Nutricia PreOp®) has low osmolarity (290 mOsm/kg) and elicits the required insulin response. Limited number of studies explored the effectiveness of other products such as Vitajoule® (Noblett et al, 2006), Roosvicee fruit syrup and Clearfast®. Nutricia PreOp® has been extensively used for ERAS in Europe and has been validated in several research studies. Clearfast® is similar to Nutricia PreOp® in composition and osmolality. All of these products are yet to become available in Canada, therefore the ERAS Nutrition Working Group proposed the use of commercially available apple juice and cranberry cocktail with the lowest osmolality. The following criteria were used to drive the product selection: availability, palatability, clinical considerations, volume needed, ease and process of administration, cost of product, infection control and simplicity (for patient use and nurses and physicians to discuss with and teach patients). Juices are readily available and palatable, can be easily administered and are low in cost. Although juice utilization has not been validated as an effective preoperative carbohydrate loading option, it was found to be safe for use preoperatively and to date it is the only option available for use in surgery patients in Canada. Consensus on preoperative carbohydrate loading products may be updated once new research and products that meet the criteria are available.

References


Acknowledgements

We would like to acknowledge the contributions of the clinicians who participated in the development of this topic. Your expertise and time spent are appreciated.

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<tr>
<th>Name</th>
<th>Title</th>
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<td>Candice Healey</td>
<td>Registered Nurse</td>
<td>Provincial</td>
</tr>
</tbody>
</table>

Thank you to the clinicians who participated in the review process. Your time spent reviewing the knowledge topics and providing valuable feedback is appreciated.