

Emergency colorectal surgery : what should we teach our residents?

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In daily practice, it is estimated that up to 30% of colorectal operations are related to emergency conditions.

According to Western studies, the mortality and the complication rates are high in such cases, ranging from 10% to 25% and from 30% to 50%, respectively.

The National Laparotomy Audit (NELA) of Coloproctology of Great Britain and Ireland (ACPGBI) report at 2016/2017 reveals that almost 50% of all emergency laparotomies are performed because of colorectal pathology.

Recent publications have shown that the outcomes for those patients with acute colorectal problems are best when dealt with by a colorectal specialist.

Enhanced recovery after surgery (ERAS):

It is a multidisciplinary program designed to minimize stress response to surgery and promote the recovery of organ function.

It becomes a standard of perioperative care for elective colorectal surgery.

Enhanced recovery after surgery (ERAS):

In an elective setting, ERAS program has shown to:

- ✓ decrease postoperative complication.
- ✓ reduce length of hospital stay.
- ✓ shorten convalescence.
- ✓ lower health care cost.

Recently, there is emerging evidence that ERAS program can be safely and effectively applied to patients with emergency colorectal conditions such as acute colonic obstruction.

ERAS elements for colorectal emergency surgeries:

- 1- Preoperative phase.**
- 2- Intraoperative phase.**
- 3- Postoperative phase.**

1- Preoperative phase:

- Antibiotic and thromboembolic prophylaxis (as per the hospital protocol).
- Blood glucose control.
- C-reactive protein.
- Stoma marking.
- No anaesthetic premedication.

2- Intraoperative phase:

1. Anaesthetic procedure.
2. Surgical procedure.

1. Anaesthetic procedure:

- Nausea and vomiting prophylaxis: dexamethasone (5 mg) and ondansetron (4 mg)
- Epidural catheter for analgesia (T6–T10 according to incision): levobupivacaine 0.125–0.0675%.
- Non-invasive blood pressure, pulse oximetry, heart rate.
- Hypothermia prevention (thermal blanket 37 °C).
- Optimization of fluid therapy with Doppler monitoring whenever possible.

1. Anaesthetic procedure:

- Intravenous fluid balance: fluid therapy with continuous infusion of balanced solution (3.5 ml/kg/h for laparoscopic surgery and 7 ml/kg/h for laparotomy).
- Invasive monitoring if necessary (central line, arterial catheter) to avoid central intravenous catheters.
- Maintenance of anaesthesia with total intravenous anaesthesia.
- Infiltration of local anaesthetic into the incision and trocar sites.
- Avoid opiates (use short-acting opioids if needed).
- Maintain blood haemoglobin levels above 8 g/dL.

2. Surgical procedure:

- Laparoscopy or laparotomy.
- Avoid abdominal drains.
- Nasogastric aspiration, if present, will be removed before extubation or within <12 postoperative hours.

3- Postoperative phase:

PO Day	Diet	Medication	Mobilisation	Removal of tubes	Blood Tests
0	Start fluid intake after 20 to 24 PO hours	Analgesia Paracetamol 1 g IV/8 h. (alternate) Dexketoprofen 50 mg IV/8 h. (alternate) Omeprazole 20 mg IV/24 h Antibiotics as per protocol Enoxaparin 40 mg Sc/24 h	Start sedestation		
1	Progressive diet according to tolerance	Same	Sedestation Start ambulation		
2	<ul style="list-style-type: none"> ● Progressive diet according to tolerance ● Stop IV fluid therapy if tolerated. ● Maintain heparinised IV 	If diet is tolerated: <ul style="list-style-type: none"> ● Analgesia: Paracetamol 1 g oral/8 h Ibuprofen 600 mg oral/8 h (alternate) ● Omeprazole 20 mg oral/24 h ● Antibiotics as per protocol ● Enoxaparin 40 mg Sc/24 h 	Equal	<ul style="list-style-type: none"> ● Removal of epidural analgesia ● Removal of bladder catheter ● Removal of abdominal drainage 	
3	Basal diet	Same	Same		With CRP
4/5	Basal diet	Same	Same		CPR (5 days)
6	Basal diet	Discharge criteria: No complications, controlled pain, complete ambulation, patient acceptance.			

Preoperative phase:

1. Pre operative Stoma marking.

structured patient stoma education by an enterostomal nurse specialist was shown to:

- ✓ reduce length of hospital stay.
- ✓ improve patient's quality of life and psychosocial adjustment.

Therefore stoma education should be given preoperatively (if feasible) and stoma teaching should be performed as soon as possible in the early postoperative period.

2- Preoperative optimization of general conditions:

The impact of preoperative optimization on clinical outcome following emergency laparotomy has recently been studied and achieving the following goals improve the out come of the patients.

- ✓ Central venous pressure 8-12 cmH₂O.
- ✓ Mean arterial pressure of 65 mmHg or above.
- ✓ Urine output at least 0.5 mL/kg per hour.
- ✓ Empirical broad-spectrum antibiotics were given intravenously to patients.

Preoperative phase:

3- Perioperative glycemic control:

Preoperative high HbA1c and perioperative hyperglycemia were associated with major adverse events after emergency general surgery including colorectal operations.

Despite the difficulty in optimizing preoperative HbA1c in emergency patients, perioperative glycemic control is still possible and crucial in both diabetic patients and non-diabetic patients.

Distinctive perioperative glucose management should be guided by preoperative glycemic control, type of an operation and patient's status with targeted glucose levels between 140 and 180 mg/dl.

Intraoperative phase

1- Use of epidural analgesia:

Within an ERAS protocol, the use of thoracic epidural analgesia may be associated with superior pain control and quicker return of gut function but this does not translate into improved recovery or reduced morbidity when compared with alternative analgesic techniques.

However, the use of epidural analgesia is contraindicated in patients with:

- ✓ Coagulopathy.
- ✓ bleeding tendency.
- ✓ hemodynamic instability.

2-Goal-directed fluid therapy (GDFT) :

It aims to maintain adequate organ perfusion to delivery sufficient oxygen to all organs during and after surgery.

A recent meta-analysis of 2099 patients undergoing elective major abdominal operations including colorectal surgery indicated that, within an ERAS protocol:

- ✓ GDFT was associated with a significant reduction in the length of intensive care and time to first defecation,
- ✓ but no difference was seen in mortality, time to first passage of flatus, or risk of postoperative ileus.

3-Prevention of intraoperative hypothermia:

Perioperative hypothermia may contribute to delayed recovery and increased postoperative complications such as surgical site infection, major cardiac events, and blood loss.

Prevalence of intraoperative and postoperative hypothermia in emergency surgery could be as high as 60% especially in patients undergoing major abdominal surgery and those receiving the large amount of intravenous crystalloids. Similar to an elective setting, use of warming techniques such as forced air warming in emergency could reverse or protect against intraoperative hypothermia.

4-Laparoscopy and modifications of surgical access in emergency colorectal surgery

Based on the recent evidence of laparoscopic approach to emergency colorectal surgery, it was suggested that laparoscopy was linked to a lower rate of postoperative complication and a shorter length of hospital stay when comparing with open surgery.

With a sufficient expertise in laparoscopic approach in selective patients, emergency laparoscopy for colon cancer is not inferior to open surgery with regard to short- and long-term oncological outcomes.

However, the evidence supporting the feasibility of laparoscopic surgery in emergency setting was mainly based on operations for obstructed colon cancer .

In perforated sigmoid diverticulitis.laparoscopic sigmoid resection is feasible and safe in selected patients,hemodynamically stable, without significant comorbidities and with onset peritonitis <12-24 h, only if specific advanced laparoscopic colorectal expertise is available

in case of fecal peritonitis due to perforated diverticular disease hand assisted laparoscopic technique may be preferred in order to avoid missing a perforation and identify the healthy colon by tactile sensation laparoscopic lavage is not recommended in Hinchey IV, is safe in case of Hinchey III but it is not considered the preferred choice

5-Avoidance of intraabdominal or pelvic drainage:

The need of peritoneal drain placement after emergency laparotomy is controversial.

So far, there is insufficient evidence supporting the routine use of drain after emergency bowel resection.

Many authors have suggested avoidance of intraabdominal or pelvic drainage except with specific indications such as massive intraoperative bleeding, purulent or fecal peritonitis and risky anastomosis.

Postoperative phase

1-Early removal of nasogastric tube:

After an emergency colectomy for acute colonic obstruction or perforation, surgeons tend to retain nasogastric tube (NGT) postoperatively to decrease abdominal distension and aim to remove it on postoperative day 1 or 2.

Interestingly, the immediate removal of NGT and inclusion in ERAS protocol were not associated with the need for NGT reinsertion. Meanwhile, risk factors for NGT reinsertion were left-sided colon cancer, postoperative ileus and severe intraoperative complications.

2-Early enteral feeding:

In an elective colorectal surgery, early feeding reduced postoperative complication and length of hospital stay without significant difference in the rates of anastomotic leakage, pneumonia, vomiting and NGT reinsertion.

However, patients undergoing emergency colorectal surgery are more likely to have prolonged postoperative ileus and complications than those in an elective setting.

Accordingly, conclusions drawn from trials on elective surgery cannot be applied on emergency surgery. Meanwhile, data on early feeding after emergency abdominal surgery are limited with conflicting results.

Although the concept of early intake after emergency colorectal surgery requires adequately powered randomized controlled trials, it is believed that early feeding after emergency colorectal surgery is possible but should be tailored by the patient.

Any symptom and sign of postoperative ileus is a caution to slow feeding and Etiologies of feeding intolerance should be carefully investigated and corrected if possible

3-Postoperative breathing exercise:

A recent randomized controlled trial undergoing exploratory laparotomy including emergency colorectal surgery (about 45%) showed that adding incentive spirometry to a routine breathing exercise did not improve the recovery of postoperative pulmonary function nor decreased the rate of respiratory complication and length of hospital stay.

Although there is no evidence indicating the direct benefits of breathing exercise after emergency colorectal surgery, many surgeons still encourage their patients to have sessions of deep breathing and coughing in the early postoperative period.

4-Early mobilization and physiotherapy:

There is no strong evidence demonstrating clinical benefits of early postoperative mobilization, but prolonged immobilization could:

- ✓ increase the risk of pneumonia,
- ✓ thromboembolism,
- ✓ insulin resistance,
- ✓ and muscle weakness.

In the future, an ERAS protocol may further be tailored based on the indications of emergency surgery which could be divided into 2 main categories:

1- presence of intraabdominal infection (*e.g.*, ruptured colonic diverticulitis, perforated colorectal cancer, acute fulminant colitis).

2- absence of intraabdominal sepsis (*e.g.*, obstructed colorectal cancer and massive lower gastrointestinal bleeding).

Preoperative ERAS items might be unable to apply in patients with intraabdominal sepsis, so the intraoperative and postoperative items may be utmost important

Thank

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