

PROCEEDINGS

ERP PROTOCOLS IN MINIMALLY INVASIVE COLORECTAL SURGERY

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ABSTRACT

INTRODUCTION: Despite constantly evolving surgical techniques focused on reducing tissue trauma during surgery, innovations in anesthesia, major colorectal resections continue to be associated with significant perioperative morbidity, which is associated by prolonged hospital stay and high cost of treatment. In order to explain the complications after operation, the mechanisms of pathophysiological changes due to surgical stress must be understood. At the end of the 1990s, components of the so-called fast-track rehabilitation program aimed to achieve early recovery after major surgery. These protocols eliminate old understandings of postoperative recovery and put into practice evidence-based principles and innovations aimed at reducing physiological stress and postoperative organ dysfunction through optimization of perioperative care and recovery.

AIM: The aim of this article is to analyze the current recommendations for good clinical practice and the postulates of accelerated recovery protocols in minimally invasive colorectal surgery.

MATERIALS AND METHODS: The evidence in the modern literature on the methods of enhanced recovery after minimally invasive colorectal surgery was reviewed. Our experience with 152 minimally invasive colorectal resections was discussed.

RESULTS: Results published in the literature regarding postoperative recovery and morbidity using ERP were analyzed. The results of a personal study of 152 minimally invasive colorectal resections are reported. The perioperative complication rate was 13.8%, with a median hospital stay of 5.9 days, and perioperative mortality rate of 1.3%.

CONCLUSION: Implementation of evidence-based methods of preparation, perioperative monitoring, and postoperative care and rehabilitation are associated with significantly better outcomes in terms of perioperative complications and postoperative recovery.

Keywords: *fast-track, laparoscopic, colorectal, enhanced recovery*

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Received: August 26, 2023

Accepted: October 12, 2023

INTRODUCTION

Enhanced recovery protocols introduce in practice evidence-based methods and principles aimed at accelerating the recovery process after minimally invasive colorectal surgery by reducing physiological stress and organ dysfunction due to the operative intervention. However, the principles originally implemented in practice for open surgery are referred to minimally invasive colorectal surgery. The peri-



operative period is considered as a combination of 3 inseparable parts: preoperative, intra- and postoperative period. Traditional perioperative techniques and postulates such as immobilization, nasogastric tube, and fasting remain in history. Minimally invasive surgical techniques, preoperative intake of proteins, microelements, carbohydrate fluids, intraoperative monitoring of serum glucose, control of neuromuscular blockade, avoidance of opioid analgesics, regional analgesia techniques, maintenance of physiological temperature, postoperative immediate verticalization, nutrition, stimulation of bowel function, discontinuing long-term intravenous therapies have been shown to accelerate recovery, reduce perioperative complications, and lead to earlier discharge.

Table 1. Types of minimally invasive colorectal resections.

Right colectomy	53
Sigmoid resection	44
RRA+TSME	18
RRA+TME	11
Miles	4
Left colectomy	14
Hartmann's resection	0
Proctocolectomy	0
Simultaneous resections	2
Partial resection	2
Transverse colon resections	2
Abdominal transanal resections	2

Table 2. Implemented ERPs for minimally invasive colorectal resections.

Preoperative period	High-protein diet before admission
	Monitoring of serum glucose at admission
	Monitoring of the comorbidity and consultations with other specialists
	Antithrombotic prophylaxis: low-molecular-weight heparin in high-risk patients
	Mechanical bowel preparation: polyethylene glycol solution
Intraoperative period	Antibacterial prophylaxis: i.v. wide spectrum antibiotic at the time of initiation of the anesthesia
	Urinary catheter: in cases of stomach distention—nasogastric tube for the time of operation
	Multimodal analgesia
	Analgesia at the end of the anesthesia
	Body temperature control for the duration of the operation
	Monitoring of the neuromuscular blockade
	i.v. fluids, control of the serum glucose, administration of glucose solutions
Postoperative period	Extraction of the nasogastric tube at the day of operation
	Immediate verticalization
	Liquid intake on the day of the operation
	Non-opioids after the operation
	i.v. fluids and glucose solutions in the early postoperative period
	Antibacterial treatment until postoperative day 3
	Monitoring of the hematological parameters of the second postoperative day
	Oral food intake on postoperative day 2
	Routine administration of low-molecular-weight heparin
Removal of urinary catheter on postoperative day 2	
Discharge planning	

AIM

The aim of this article is to analyze the current recommendations for enhanced recovery, the available evidence in the specialized literature, and to share our own experience in a series of 152 minimally invasive colorectal resections.

MATERIALS AND METHODS

The present study is based on retrospective analysis of the perioperative results of a personal series of 153 minimally invasive colorectal resections. The patients were enrolled into an enhanced recovery program (ERP). All the methods for clinical assessment were used. The types of minimally invasive colorectal resections are presented in Table 1.

RESULTS

The protocols used for enhanced recovery in minimally invasive colorectal resections are indicated in the Table. 2

Perioperative results are shown in Table 3.

Table 3. Perioperative results.

Parameter	
Time to flatus	2.65 days
Time to defecation	3.05 days
Median stay in ICU	0.08 days
Median hospital stay	5.99 days
Median duration of the operation	139.5 min
Blood loss	41.71 mL
Blood transfusions in units	0.38 U

Two patients died in the postoperative period. The perioperative mortality rate was 1.3%.

Table 4. Severity of the complications by the Clavien-Dindo scale.

	Number	%
Grade I	5	23.8
Grade II	9	42.9
Grade 3a	0	0.0
Grade 3b	5	23.8
Grade 4a	0	0.0
Grade 5	2	9.5

The perioperative morbidity rate was 13.8%. The Clavien-Dindo severity scale results are shown in Table 4.

As seen from Table 4, most complications are mild.

DISCUSSION

The benefits of integrating enhanced recovery protocols are becoming clear based on the growing evidence in the current literature. According to a systematic review, including 25 prospective randomized trials comparing the use of ERPs versus conventional treatment, a significant reduction in hospital stay and perioperative complications with no difference in mortality and rehospitalizations was achieved (1). A similar meta-analysis in patients with major non-colorectal surgery also demonstrated a significant reduction in hospital stay with no difference in mortality and readmissions, while the complication rate remained without a statistically significant difference (2). The analysis in terms of recovery of intestinal motility and functions indicated that there was a significant difference in groups included in ERPs compared to conventional treatment in colorectal surgery (3). The specific elements of an enhanced recovery protocol may vary depending on goals, but there are constants that are recommended to be followed. Examples and recommendations can be found on the SAGES SMART Enhanced Recovery Program site (4). The basic elements of the program we use are largely borrowed from SAGES recommendations. When analyzing the perioperative stay, however, it should be specified that the minimal hospital stay set by the funding institution influences the reduction of the actual hospital stay. Some of the main points of ERPs are related to the education of the patients and their awareness before the start of the treatment and are essential (5). We provide detailed information to the patient regarding the diagnosis, plan for minimally invasive colorectal surgery, and the upcoming preparation, as well as the upcoming procedures until hospitalization. Mechanical bowel preparation and the use of antibacterial prophylaxis are essential to reduce postoperative complications (6,7). In our practice we use mechanical bowel preparation with polyethylene glycol solution in combination with intravenous short-time (3 days) antibacterial therapy. This strategy is associated with only 3.3% postoper-

ative infections rate. Preoperative procedures aimed to improve physical capacity and reserves, such as intake of protein foods, physical exercises, breathing exercises, quitting smoking, are related to faster recovery (8–10). A key point in the protocols is the monitoring of serum glucose pre- and intraoperatively, as well as the intake of glucose-enriched fluids (11). Avoiding insertion of nasogastric tubes, immediate alimentation, and verticalization are the key points in postoperative management (12–14).

CONCLUSION

The minimally invasive approach in colorectal surgery is a main philosophy based on protocols for enhanced recovery through minimal tissue trauma and blood loss. Implementation of all evidence-based recommended elements in the three periods: pre-, intra- and postoperative periods, leads to faster recovery of the patients after colorectal surgery and fewer perioperative complications.

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