

Application and Progress of the Concept of Enhanced Recovery After Surgery in Colorectal Cancer Patients

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Abstract: This paper comprehensively reviews the application and progress of the concept of enhanced recovery after surgery (ERAS) in colorectal cancer patients. It elaborates on the key components of ERAS, including preoperative optimization, intraoperative management, and postoperative care. The paper also analyzes the impact of ERAS on patient outcomes such as postoperative recovery time, complication rates, and quality of life. Additionally, it discusses the challenges and future directions in the implementation of ERAS in colorectal cancer surgery, aiming to provide valuable references for improving the surgical treatment and rehabilitation of colorectal cancer patients.

Keywords: Colorectal cancer; Enhanced recovery after surgery; Postoperative care; Patient outcomes

1 Introduction

Colorectal cancer is a common malignant tumor with a significant impact on human health. Surgical resection is the main treatment method for colorectal cancer. In recent years, the concept of enhanced recovery after surgery (ERAS) has been increasingly applied in colorectal cancer surgery, aiming to accelerate patient recovery, reduce postoperative complications, and improve the quality of life of patients. This paper will discuss the application and progress of the ERAS concept in colorectal cancer patients.

2 Key Components of ERAS in Colorectal Cancer Surgery

2.1 Preoperative Optimization

2.1.1 Patient Education

Provide detailed information to patients about the surgical process, postoperative recovery, and expected outcomes. This helps to reduce patient anxiety and improve their cooperation during the treatment process. For example, using brochures, videos, or face-to-face consultations to explain the importance of preoperative fasting, postoperative early mobilization, and pain management.

Educate patients about the possible complications and how to prevent and deal with them, enhancing their self-care ability.

2.1.2 Nutritional Support

Assess the nutritional status of patients before surgery. For those with malnutrition, provide appropriate nutritional support, such as enteral nutrition or parenteral nutrition, to improve their nutritional status and enhance their tolerance to surgery.

Encourage patients to eat a high-protein, high-calorie diet before surgery to promote wound healing and postoperative recovery.

2.1.3 Preoperative Fasting and Carbohydrate Loading

Traditionally, patients were required to fast for a long time before surgery. However, current evidence suggests that shortening the preoperative fasting time and allowing patients to drink a certain amount of carbohydrate-rich beverages 2 - 3 hours before surgery can reduce insulin resistance, alleviate thirst and hunger, and improve patient comfort without increasing the risk of aspiration.

2.2 Intraoperative Management

2.2.1 Anesthesia and Analgesia

Use multimodal analgesia techniques, including epidural analgesia, patient-controlled analgesia (PCA), and non-steroidal anti-inflammatory drugs (NSAIDs), to provide effective pain relief during and after surgery. This helps patients to cough, deep breathe, and mobilize early, reducing the risk of postoperative pulmonary complications and promoting gastrointestinal function recovery.

Select appropriate anesthetic agents and techniques to maintain stable hemodynamics during surgery and reduce the impact of anesthesia on the patient's physiological function.

2.2.2 Surgical Technique

Adopt minimally invasive surgical techniques, such as laparoscopic surgery and robotic-assisted surgery, whenever possible. These techniques have the advantages of less trauma, less bleeding, and faster postoperative recovery compared with traditional open surgery.

Pay attention to intraoperative heat preservation, maintaining the patient's body temperature at around 36 - 37°C, to reduce the risk of hypothermia-induced coagulation disorders, wound infection, and cardiovascular complications.

2.2.3 Fluid Management

Implement goal-directed fluid therapy to maintain appropriate intravascular volume and tissue perfusion. Avoid excessive fluid infusion, which can lead to tissue edema and affect postoperative gastrointestinal function recovery. Use intraoperative monitoring indicators such as blood pressure, heart rate, central venous pressure, and urine output to guide fluid administration.

2.4 Postoperative Care

2.4.1 Early Mobilization

Encourage patients to get out of bed and start mobilization as early as possible after surgery, usually within 24 hours. Early mobilization can promote blood circulation, prevent venous thrombosis, improve respiratory function, and enhance gastrointestinal motility. Provide assistance and support to patients during mobilization to ensure their safety.

2.4.2 Early Feeding

Resume oral feeding as soon as possible after surgery, usually starting with clear fluids a few hours after surgery and gradually transitioning to a normal diet. Early feeding can stimulate gastrointestinal function recovery, maintain gut mucosal integrity, and improve the patient's nutritional status. However, it is necessary to closely observe the patient's tolerance to feeding and adjust the feeding plan accordingly.

2.4.3 Drainage Tube Management

Minimize the use of drainage tubes and remove them as early as possible if possible. Prolonged use of drainage tubes may increase the risk of infection and affect patient mobility and comfort. Monitor the drainage volume and characteristics closely, and remove the drainage tube when the indications are met.

3 Impact of ERAS on Patient Outcomes

3.1 Postoperative Recovery Time

3.1.1 Hospital Stay

Numerous studies have shown that the implementation of ERAS can significantly shorten the hospital stay of colorectal cancer patients. By optimizing the preoperative, intraoperative, and postoperative management processes, patients can recover faster and be discharged earlier. For example, some studies have reported that the average hospital stay can be reduced by 2 - 3 days compared with the traditional care model.

3.1.2 Gastrointestinal Function Recovery

ERAS measures can promote the early recovery of gastrointestinal function. The time to first flatus and defecation is usually shorter in patients under the ERAS program. This is beneficial for patients to resume normal diet and nutrition intake earlier and also reduces the risk of gastrointestinal complications such as ileus.

3.1.3 Wound Healing

With improved nutritional status, reduced stress response, and better perioperative management, the wound healing rate in ERAS patients is generally higher. Faster wound healing can reduce the risk of wound infection and other related complications, further facilitating the patient's recovery process.

3.2 Complication Rates

3.2.1 Surgical Site Infections

Appropriate preoperative preparation, intraoperative aseptic techniques, and postoperative care measures in ERAS can reduce the incidence of surgical site infections. For example, maintaining normal body temperature during surgery, shortening the preoperative fasting time, and early removal of drainage tubes all contribute to reducing the risk of infection at the surgical site.

3.2.2 Pulmonary Complications

Early mobilization and effective pain management in ERAS can prevent postoperative pulmonary complications such as atelectasis and pneumonia. By encouraging patients to cough and deep breathe, the incidence of pulmonary complications can be significantly decreased, improving the patient's respiratory function and overall prognosis.

3.3.3 Ileus and Other Gastrointestinal Complications

The early feeding and enhanced gastrointestinal motility management in ERAS can reduce the occurrence of ileus and other gastrointestinal complications. By stimulating the gastrointestinal tract to function early, the normal rhythm of the gastrointestinal tract can be restored more quickly, reducing the patient's discomfort and the need for further treatment.

3.4 Quality of Life

3.4.1 Physical Function

The faster postoperative recovery and earlier return to normal activities enabled by ERAS can improve the physical function of patients. Patients are able to perform daily activities more independently and have better physical endurance, which positively affects their quality of life.

3.4.2 Psychological State

Shorter hospital stays, reduced pain, and fewer complications can also improve the psychological state of patients. They experience less anxiety and depression, and have a more positive attitude towards recovery and life, which is conducive to their overall well-being and quality of life improvement.

3.4.3 Social Function

With the improvement of physical and psychological conditions, patients can better integrate into social life, resume work and social activities earlier, and regain their social roles and functions, thereby enhancing their quality of life from a social perspective.

4 Challenges and Future Directions in the Implementation of ERAS

4.1 Challenges

4.1.1 Multidisciplinary Collaboration

The implementation of ERAS requires close collaboration among surgeons, anesthesiologists, nurses, nutritionists, and other healthcare professionals. However, in actual practice, there may be challenges in communication and coordination among different disciplines, which may affect the smooth implementation of the ERAS program. For example, differences in professional perspectives and work habits may lead to differences in the understanding and implementation of some ERAS measures.

4.1.2 Patient Compliance

Some patients may have difficulty understanding and complying with the complex requirements of the ERAS program, such as preoperative fasting and carbohydrate loading, early mobilization, and early feeding. Patient factors such as age, education level, and psychological state may also affect their compliance. For example, elderly patients or those with low education levels may have more difficulties in understanding and following the instructions.

4.1.3 Traditional view and Practice Habits

Some healthcare providers may be influenced by traditional 观念 and practice habits and may be reluctant to fully adopt the new ERAS concept and measures. There may also be concerns about the safety and effectiveness of some novel ERAS measures, which need to be further addressed through education and evidence-based practice.

4.2 Future Directions

4.2.1 Further Optimization of the ERAS Program

Continue to explore and optimize the key components of the ERAS program based on more evidence and clinical practice. For example, further refine the preoperative assessment and optimization strategies, improve the accuracy and individualization of intraoperative management, and develop more effective postoperative care measures to better meet the needs of patients and improve the quality of care.

4.2.2 Enhanced Patient Education and Support

Develop more effective patient education methods and materials to improve patient understanding and compliance with the ERAS program. Provide more comprehensive support and guidance to patients during the perioperative period, including psychological support and home care instructions after discharge, to ensure the continuity and effectiveness of the ERAS measures.

4.2.3 Research on Long-Term Outcomes

While current studies have mainly focused on short-term outcomes such as postoperative recovery time and complication rates, more research is needed on the long-term outcomes of ERAS in colorectal cancer patients, such as cancer recurrence, survival rates, and long-term quality of life. This will help to further evaluate the overall benefits and value of the ERAS concept in colorectal cancer treatment.

4.2.4 Promotion and Standardization of ERAS

Strengthen the promotion and training of the ERAS concept and practice in the medical community to improve the awareness and acceptance of healthcare providers. At the same time, work towards the standardization of the ERAS program to ensure its consistent and high-quality implementation in different hospitals and regions, thereby benefiting more colorectal cancer patients.

5 Conclusion

The application of the ERAS concept in colorectal cancer surgery has shown great potential in promoting patient recovery, reducing complications, and improving quality of life. However, there are still some challenges in its implementation. By addressing these challenges and continuously exploring and innovating, we can further optimize the ERAS program and improve the surgical treatment and rehabilitation outcomes of colorectal cancer patients. Future research should focus on further improving the effectiveness and standardization of ERAS and evaluating its long-term impact, with the ultimate goal of providing better care and outcomes for colorectal cancer patients.

Reference:

- [1]Qin Y ,Xie H ,Liu T , et al. Prognostic value of the fat-free mass index-based cachexia index in patients with colorectal cancer [J]. *Scientific Reports*, 2024, 14 (1): 24390-24390.
- [2]Ren C ,Zeng Y ,Qiu L , et al. Study on the effects of intraoperative administration of dexmedetomidine on the prognosis and survival outcomes of patients with colorectal cancer [J]. *Heliyon*, 2024, 10 (19): e38241-e38241.
- [3]Sun Y ,Zheng P Z ,Li H , et al. [Retracted] ANRIL is associated with the survival rate of patients with colorectal cancer, and affects cell migration and invasion in vitro. [J]. *Molecular medicine reports*, 2024, 30 (6):
- [4]Cai H ,Chen Y ,Li C J , et al. A Novel Nutrition-Related Prognostic Biomarker for Predicting Survival in Patients with Colorectal Cancer. [J]. *Nutrition and cancer*, 2024, 1-9.