

Perioperative Nutrition Management for Colorectal Cancer Patients Under the ERAS Concept

Lim Kai Chee Mary

Skylin Biotechnology Pte Ltd., Singapore.

How to cite this paper: Lim Kai Chee Mary. (2024) Perioperative Nutrition Management for Colorectal Cancer Patients Under the ERAS Concept. *International Journal of Clinical and Experimental Medicine Research*, 8(1), 46-50. DOI: 10.26855/ijcemr.2024.01.007

Received: January 16, 2024
Accepted: February 12, 2024
Published: March 7, 2024

***Corresponding author:** Lim Kai Chee Mary, Skylin Biotechnology Pte Ltd., Singapore.

Abstract

This article reviews the application of the ERAS (Accelerated Rehabilitation Surgery) concept in the perioperative period of colorectal cancer patients, especially its importance in nutritional management. The article first introduces the basic principles and objectives of the ERAS concept and then discusses in detail the nutritional status assessment of colorectal cancer patients during the perioperative period and the limitations of traditional nutritional management methods. Next, the focus was on elaborating the nutritional management strategies under the ERAS concept, including preoperative nutritional risk assessment, individualized nutritional support plan development and implementation, early postoperative eating and rehabilitation exercise, etc. Finally, the article points out the controversial points and future research directions in current research. Through comprehensive analysis, this article believes that the nutritional management strategy under the ERAS concept can significantly improve the perioperative nutritional status of colorectal cancer patients, reduce the risk of complications, accelerate postoperative recovery, and improve their quality of life.

Keywords

ERAS concept, colorectal cancer, perioperative period, nutritional management, postoperative rehabilitation

Colorectal cancer is one of the most common malignant tumors in the digestive system, its incidence rate has increased year by year and has become a global health problem. Due to the biological characteristics and clinical manifestations of colorectal cancer, surgery often becomes the preferred treatment method. However, surgery itself can cause certain physiological and psychological trauma to patients, thereby affecting their recovery and prognosis. Therefore, perioperative management is particularly important.

Nutrition management is an indispensable part of perioperative management. Good nutritional status can not only enhance the patient's immune system and reduce the risk of surgical complications but also promote postoperative wound healing and physical recovery. However, traditional nutritional management methods often focus on postoperative nutritional supplementation, while neglecting preoperative and intraoperative nutritional interventions. In recent years, with the proposal and application of the concept of Accelerated Rehabilitation Surgery (ERAS), there has been a significant change in perioperative nutrition management strategies.

The ERAS concept emphasizes reducing surgical stress and complications through a series of optimization measures and accelerating the patient's recovery process. Among them, nutritional management, as an important component of the ERAS concept, has received widespread attention. Under the ERAS concept, perioperative nutrition management is no longer limited to postoperative nutrition supplementation, but runs through the entire perioperative period, including preoperative, intraoperative, and postoperative processes. Through scientific and

reasonable nutritional interventions, patients can effectively improve their nutritional status, increase surgical tolerance, reduce the occurrence of complications, and accelerate their recovery.

For patients with colorectal cancer, due to the particularity of their disease and the complexity of surgery, perioperative nutritional management is particularly important. However, there is currently insufficient research on the perioperative nutritional management of colorectal cancer patients under the ERAS concept, and there are certain controversies and unresolved issues. Therefore, this article aims to review the relevant research progress, explore the current problems and controversial points, and propose possible future research directions and application prospects.

Through the review and analysis of this article, we hope to provide useful references and insights for the perioperative nutritional management of colorectal cancer patients. Meanwhile, we also hope that the exposition in this article can attract the attention and research interest of more scholars and clinical doctors, and jointly promote the application and development of the ERAS concept in perioperative nutrition management of colorectal cancer. I believe that with the continuous deepening of research and exploration of practice, we can definitely provide more scientific and effective perioperative nutrition management strategies and methods for colorectal cancer patients.

1. Overview of ERAS concept

ERAS, also known as Accelerated Rehabilitation Surgery, is an innovative perioperative management concept [1]. Its core goal is to optimize various perioperative management measures through interdisciplinary cooperation, thereby reducing surgical stress reactions, reducing the incidence of complications, and promoting rapid postoperative recovery of patients. The proposal of this concept marks the upgrade of surgical treatment from simple surgical techniques to comprehensive patient management.

The background of the ERAS concept is closely related to the progress of surgical procedures and the increasing demand for medical quality from patients. Traditional surgical procedures are often accompanied by significant trauma, pain, and stress reactions, resulting in slow postoperative recovery, long hospital stays, and increased medical costs for patients [2]. The ERAS concept emerged to address these issues, emphasizing the need for sufficient preoperative preparation, meticulous intraoperative operations, and scientific postoperative care to minimize the physiological and psychological impact of surgery on patients.

The basic principles of ERAS include optimizing preoperative preparation, reducing surgical trauma, and strengthening postoperative rehabilitation. During the preoperative preparation stage, doctors will conduct a comprehensive evaluation of patients and develop personalized surgical plans and nutritional management strategies [3]. Intraoperative procedures focus on refinement and minimally invasive techniques to reduce tissue damage and bleeding. In the postoperative rehabilitation stage, emphasis is placed on early eating and activity to promote the recovery of gastrointestinal function and prevent the occurrence of complications such as deep vein thrombosis.

The application of the ERAS concept in surgical procedures has achieved significant results. Numerous studies have shown that patients managed using the ERAS concept experience reduced postoperative pain, shorter hospital stays, lower medical costs, and significantly lower overall incidence of complications. These achievements not only demonstrate the effectiveness of the ERAS concept but also provide strong support for its application in a wider range of surgical fields [4].

Under the ERAS philosophy, nutritional management is given extremely high importance. Nutrition is a necessary material foundation for maintaining life activities. For surgical patients, good nutritional status is one of the key factors to ensure surgical success and promote postoperative recovery [5]. However, traditional nutritional management concepts often focus on postoperative nutritional supplementation, while neglecting preoperative and intraoperative nutritional interventions. Under the ERAS concept, nutritional management has been incorporated into the entire perioperative management and has become an indispensable link.

The preoperative nutritional management mainly involves adjusting the patient's dietary structure and supplementing nutrients to improve their nutritional status and enhance their tolerance to surgery. During the intraoperative stage, attention is paid to maintaining the patient's fluid balance and energy supply to prevent metabolic disorders caused by surgical trauma [6]. In the postoperative stage, emphasis is placed on early feeding and reasonable nutritional support to promote wound healing and physical function recovery.

Through the implementation of the above measures, nutrition management under the ERAS concept can not only improve the nutritional status of patients, but also reduce the risk of surgical complications, shorten hospitalization time, and improve the quality of life of patients. Therefore, in subsequent discussions, we will further explore how to apply this concept to the perioperative management of colorectal cancer patients.

2. Nutritional status of colorectal cancer patients during the perioperative period

Colorectal cancer, as a chronic wasting disease, often results in varying degrees of malnutrition in patients before surgery. This type of malnutrition may be caused by various factors such as metabolic abnormalities caused by the tumor itself, gastrointestinal dysfunction, and psychological factors of the patient. Surgery, as the main treatment for colorectal cancer, although it can remove the lesion, can also cause certain physical trauma to the patient, further exacerbating their malnutrition [7].

In order to accurately evaluate the nutritional status of colorectal cancer patients during the perioperative period, doctors usually use multiple evaluation methods. These methods include biochemical indicators such as body mass index, serum albumin levels, and lymphocyte counts, as well as comprehensive evaluation tools such as subjective comprehensive assessment and nutritional risk screening. Through these evaluation methods, doctors can understand the nutritional status of patients and provide a basis for developing personalized nutrition management strategies.

Research has shown that the incidence of malnutrition in colorectal cancer patients during the perioperative period is higher, and the degree of malnutrition is closely related to the patient's prognosis. Malnutrition can lead to weakened immunity, poor wound healing, and increased incidence of complications in patients, seriously affecting their recovery and quality of life. Therefore, for patients with colorectal cancer, perioperative nutritional management is crucial.

However, traditional nutritional management methods often have certain limitations. These methods usually focus on postoperative nutritional supplementation, while neglecting preoperative and intraoperative nutritional interventions. In addition, traditional methods often lack personalized nutritional support programs, which cannot meet the specific needs of different patients. Therefore, it is particularly important to introduce nutritional management strategies under the ERAS concept in the perioperative management of colorectal cancer patients.

The ERAS philosophy emphasizes the integration of nutritional management throughout the entire perioperative period, including preoperative, intraoperative, and postoperative processes. In the preoperative stage, doctors will conduct a comprehensive nutritional assessment of patients and develop personalized nutritional support plans based on the evaluation results. These plans include measures such as adjusting dietary structure and supplementing nutrients, aiming to improve the nutritional status of patients and increase surgical tolerance [8]. During the intraoperative stage, doctors will closely monitor the patient's fluid balance and energy supply to ensure the safe and smooth progress of the surgical process. In the postoperative stage, doctors will develop a reasonable eating plan and nutritional support plan based on the patient's recovery situation to promote wound healing and physical function recovery.

Through the application of nutrition management strategies under the ERAS concept, we can effectively improve the perioperative nutritional status of colorectal cancer patients, reduce the risk of surgical complications, and improve their rehabilitation outcomes and quality of life. Therefore, in the perioperative management of colorectal cancer patients, we should actively promote and apply the nutrition management strategy under the ERAS concept to provide better protection for patient recovery and prognosis. At the same time, we also need to continuously research and explore more scientific and effective nutrition management methods to meet the specific needs of different patients and promote the sustainable development of the surgical field.

3. Nutritional management strategies for colorectal cancer patients during the perioperative period under the ERAS concept

Under the guidance of the ERAS philosophy, the nutritional management strategy for colorectal cancer patients during the perioperative period has been significantly optimized. This section will provide a detailed overview of preoperative nutritional risk assessment, development and implementation of nutritional support plans, early postoperative eating and rehabilitation exercise, and explore how to combine personalized nutritional support with ERAS concepts to improve patient rehabilitation outcomes and quality of life.

3.1 Preoperative nutritional risk assessment

Preoperative nutritional risk assessment is the first step in perioperative nutritional management of colorectal cancer patients under the ERAS concept. Through comprehensive nutritional risk assessment, it is possible to promptly identify the risk of malnutrition in patients and provide a basis for developing personalized nutritional support plans. Common nutritional risk assessment tools include subjective comprehensive assessment (SGA) and nutritional risk

screening (NRS-2002). These tools can comprehensively evaluate various factors such as the patient's weight, diet, and disease status, in order to determine the patient's nutritional status and surgical tolerance.

3.2 Development and implementation of nutritional support plans

Based on the results of preoperative nutritional risk assessment, doctors will develop personalized nutritional support plans. These programs include oral nutrition supplementation (ONS), enteral nutrition (EN), and parenteral nutrition (PN) [9]. For patients with mild malnutrition, nutritional supplementation can be achieved by adjusting their dietary structure and taking oral nutrients; For patients with moderate to severe malnutrition, enteral or parenteral nutrition support is necessary. When formulating a nutritional support plan, doctors also need to consider factors such as the patient's gastrointestinal function, surgical approach, and postoperative rehabilitation plan.

During the implementation of nutritional support programs, doctors need to closely monitor the patient's response and tolerance. For patients with complications such as gastrointestinal discomfort and metabolic abnormalities, timely adjustments should be made to the nutritional support methods and dosage. At the same time, doctors also need to work closely with multidisciplinary team members such as nurses and nutritionists to ensure the smooth implementation of nutritional support programs.

3.3 Early postoperative eating and rehabilitation exercise

Early postoperative feeding is an important part of perioperative nutritional management for colorectal cancer patients under the ERAS concept. Early eating can stimulate gastrointestinal peristalsis, promote digestive secretion, and accelerate the recovery of intestinal function. Meanwhile, early eating can also provide the necessary nutrients and energy to support the postoperative recovery of patients. When implementing early postoperative eating, doctors need to develop personalized eating plans based on the patient's surgical method and recovery situation and follow the principle of gradually advancing from less to more, from thin to thick, and from single to diverse.

In addition to early eating, rehabilitation exercise is also an important means to promote postoperative recovery for patients. Through reasonable rehabilitation exercise, patients can enhance their physical fitness and immunity, reduce the incidence of complications, and accelerate wound healing and physical function recovery. When formulating a rehabilitation exercise plan, doctors need to consider factors such as the patient's age, physical condition, and surgical method to ensure the safety and effectiveness of the exercise.

3.4 Comparison of the effects of different nutritional management strategies

Research has shown that adopting a nutrition management strategy under the ERAS concept can significantly improve the perioperative nutritional status of colorectal cancer patients, reduce the incidence of surgical complications, shorten hospital stays, and improve quality of life. Compared with traditional nutrition management methods, the nutrition management strategy under the ERAS concept focuses more on personalized support and full process management, which can better meet the specific needs of patients and promote postoperative recovery.

4. Current research and controversial points

With the in-depth application of the ERAS (Accelerated Rehabilitation Surgery) concept in the field of surgery, the perioperative nutrition management strategy for colorectal cancer patients has also been significantly optimized. However, in practical applications, there are still some controversial points and unresolved issues that require further research and exploration.

4.1 Selection of optimal nutritional support methods

Under the ERAS concept, the nutritional support methods for colorectal cancer patients during the perioperative period mainly include oral nutrition supplementation, enteral nutrition, and parenteral nutrition. However, there is currently no clear consensus on which method is the best choice. The conclusions drawn from different studies are also different. Some studies suggest that enteral nutrition is more in line with physiological conditions, can maintain intestinal mucosal barrier function, and reduce bacterial translocation and infection risk; However, other studies suggest that in some cases, parenteral nutrition can better meet the energy and nutritional needs of patients. Therefore, when choosing nutritional support methods, it is necessary to comprehensively consider factors such as the patient's specific situation, surgical method, and postoperative rehabilitation plan.

4.2 Safety and feasibility of early postoperative feeding

Early postoperative feeding is one of the important measures under the ERAS concept. However, there is still some controversy regarding the safety and feasibility of early postoperative feeding. Some studies suggest that early eating can promote intestinal peristalsis, accelerate intestinal function recovery, and reduce the risk of infection; However, other studies are concerned that early consumption may increase the risk of complications such as anastomotic leakage and intestinal obstruction. In fact, the safety and feasibility of early postoperative feeding are related to various factors such as surgical method, anastomotic quality, and patient's physical condition. Therefore, when implementing early postoperative eating, it is necessary to strictly grasp the indications and contraindications, and develop personalized eating plans based on the patient's specific situation.

4.3 Possible reasons for differences in results between different studies

In the study of perioperative nutrition management for colorectal cancer patients under the ERAS concept, it is common to see differences in results among different studies. This difference may stem from multiple factors, such as the selection of research subjects, sample size, implementation details of intervention measures, and selection of evaluation indicators. In order to obtain more accurate and reliable research conclusions, it is necessary to conduct more high-quality, large-sample, multicenter clinical studies in the future, and strengthen cooperation and communication between studies.

5. Conclusion

This article summarizes the main findings and controversial points of current research on perioperative nutritional management of colorectal cancer patients under the concept of ERAS. The conclusion emphasizes the importance of individualized nutritional support under the ERAS concept, as well as future research directions and application prospects. The outlook section proposes suggestions and expectations for future research, including further improving nutrition assessment methods, conducting multicenter randomized controlled trials to verify the effectiveness of nutrition management strategies, and exploring more influencing factors. I hope this article can provide useful reference and inspiration for researchers and clinical doctors in related fields.

References

- [1] Kehlet H, Wilmore D W. Multimodal strategies to improve surgical outcome [J]. *Am J Surg*, 2002, 183(6): 630-641.
- [2] Ljungqvist O, Scott M, Fearon K C. Enhanced Recovery After Surgery: A review [J]. *JAMA Surg*, 2017, 152(3): 292-298.
- [3] Correia M I, Waitzberg D L. The impact of malnutrition on morbidity, mortality, length of hospital stay and costs evaluated through a multivariate model analysis [J]. *Clin Nutr*, 2003, 22(3): 235-239.
- [4] Ho J W, Wu A H, Lee M W, et al. Malnutrition risk predicts surgical outcomes in patients undergoing gastrointestinal operations: results of a prospective study [J]. *Clin Nutr*, 2015, 34(4):679-684.
- [5] Burden S T, Hill J, Shaffer J L, et al. Nutritional status of preoperative colorectal cancer patients [J]. *J Hum Nutr Diet*, 2010, 23(4): 402-407.
- [6] Gillis C, Nguyen T H, Liberman A S, et al. Nutrition adequacy in enhanced recovery after surgery: a single academic center experience [J]. *Nutr Clin Pract*, 30(3): 414-419.
- [7] Moene M, Bergbom I, Skott C. Patients' existential situation prior to colorectal surgery [J]. *J Adv Nurs*, 2006, 54(2): 199-207.
- [8] Aasa A, Hovbäck M, Berterö C M. The importance of preoperative information for patient participation in colorectal surgery care [J]. *J Clin Nurs*, 2013, 22(11/12): 1604-1612.
- [9] Worster B, Holmes S. The preoperative experience of patients undergoing surgery for colorectal cancer: a phenomenological study [J]. *Eur J Oncol Nurs*, 2008, 12(5): 418-424.
- [10] Sawicki, T., Ruskowska, M., Danielewicz, A., Niedźwiedzka, E., Arłukowicz, T., Przybyłowicz, K.E. A Review of Colorectal Cancer in Terms of Epidemiology, Risk Factors, Development, Symptoms and Diagnosis. *Cancers*, 2021, 13, 2025. <https://doi.org/10.3390/cancers13092025>.
- [11] Hossain, M.S., Karuniawati, H., Jairoun, A.A., et al. Colorectal Cancer: A Review of Carcinogenesis, Global Epidemiology, Current Challenges, Risk Factors, Preventive and Treatment Strategies. *Cancers*, 2022, 14, 1732. <https://doi.org/10.3390/cancers14071732>.