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Construction of an Evidence-based Practice Protocol for Perioperative Nutritional Optimization in Esophageal Cancer Patients

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Abstract: *Objective*: To construct an evidence-based practice plan for perioperative nutritional optimization in esophageal cancer patients. *Methods*: By systematically searching relevant guidelines at home and abroad, two experts independently assessed the quality of the guidelines, extracted valuable evidence and recommendations, and initially formed a draft nursing program. Subsequently, an expert panel was organized to conduct a detailed discussion to review the practicality and effectiveness of the recommendations one by one, and the program was finally revised and improved. *Results*: The protocol covered four stages of patients' admission, preoperative, postoperative, and discharge, involving specific contents such as nutritional assessment, risk screening, dysphagia assessment, nutritional therapy, enteral and parenteral nutritional support, symptom management, and health education. The program included a total of 61 entries, with 33 class A recommendations and 28 class B recommendations. *Conclusion*: The constructed perioperative nutritional care program for esophageal cancer patients is scientific and practical, and can provide practical guidance for clinical care.

Keywords: Esophageal cancer; Perioperative care; Nutritional care; Evidence-based care; Assessment; Health education; Complications

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1. Introduction

Esophageal cancer is a common malignant tumor of the digestive system, With advancements in modern medicine, including surgery, radiotherapy, chemotherapy, and other treatments, the survival rate of patients has gradually improved [1]. However, due to multiple complications during surgery and treatment, patients still face many challenges in perioperative management, especially poor nutritional status in the perioperative period, which has a crucial impact on surgical outcome, postoperative recovery, and quality of life, and not only exacerbates postoperative complications and prolongs hospitalization, but also leads to a delay in the recovery process [2]. Relevant studies have shown that early nutritional screening and assessment of esophageal cancer patients and

timely implementation of nutritional intervention can effectively improve the nutritional status of patients, reduce the occurrence of postoperative complications, and thus improve the prognostic effect and accelerate the recovery process [3]. However, at present, there is a lack of systematic and standardized practice protocols for perioperative nutritional intervention in esophageal cancer patients, and many clinical caregivers lack the guidance of evidence-based bases, which leads to a certain degree of variability in care outcomes. Evidence-based medicine, as a medical practice model based on the best evidence, helps clinical workers make scientific and rational decisions by collecting, evaluating, and applying high-quality evidence from clinical studies [4]. This study aims to construct a set of evidence-based perioperative nutritional optimization practice protocols for patients with esophageal cancer, by systematically evaluating the existing nutritional care guidelines at home and abroad, refining the effective evidence, and combining the current scientific research results with the actual clinical needs, to form a set of comprehensive, scientific, and practical care protocols, which are designed to provide more standardized guidance for perioperative care of patients with esophageal cancer.

2. Information and methodology

2.1. Establishment of an evidence-based practice program building team

A special working group was set up, consisting of one postgraduate supervisor, two nurse leaders, and three current master's degree students, all of whom had received training in evidence-based nursing systems and possessed a certain degree of theoretical foundation and practical experience. The team members jointly participated in the search for relevant nursing guidelines, quality assessment, and integration of recommendations, and finally formed a preliminary draft protocol for perioperative nutritional care of esophageal cancer patients. During the program validation stage, an expert panel was formed consisting of one chief physician, two deputy chief physicians, one dietitian, three charge nurses, and one nursing backbone (case nutrition nurse). The eight expert panel members had an age range of 31–54 years old, with an average age of 40.35 ± 3.23 years old, and had extensive experience in the work. The working experience ranged from 9–25 years. Academic background: four undergraduates, three masters, and one PhD. The multidisciplinary cooperation and expert participation characteristics of the group ensured the quality and authority of the evidence-based practice program and laid a solid foundation for subsequent program revision and promotion.

2.2. Research methodology

2.2.1. Guide search

In this study, we searched domestic and international authoritative databases and the official websites of relevant nutritional societies to collect guidelines related to the nutritional management of esophageal cancer patients. The search was performed using the terms "esophageal neoplasm/esophagus cancer," "nutrition/nutritional," "malnutrition/malnourished," "parenteral nutrition," "enteral nutrition," "esophagectomy/esophageal resection/esophagus resection," "guideline," and other keywords in English, and Chinese keywords such as "parenteral nutrition," "esophagectomy," and "guidelines" were searched with a combination of subject terms and free words. The search timeframe was set from January 1, 2016, to May 1, 2024, to ensure that the data were up-to-date and authoritative. Databases were selected from PubMed, Cochrane Library, OVID, EMBASE, CINAHL, SinoMed, China Knowledge Network (CNKI), Wipo, Wanfang, and others. Relevant guidelines were also sourced from the Medical Pulse Guidelines Network, World Health Organization (WHO), JBI Evidence-Based Library,

National Institute for Clinical Excellence (NICE) in the UK, Scottish Intercollegiate Guidelines Network (SIGN), Registered Nurses Association of Ontario (RNAO) in Canada, Canadian Clinical Practice Guidelines Database (CMACPGInfobase), and the New Zealand Guidelines Study Group (NZGG) [5]. In addition, websites of important organizations in the field of nutrition were searched, including the European Society for Parenteral and Enteral Nutrition (ESPEN), the American Society for Parenteral and Enteral Nutrition (ASPEN), the American Dietitian Nutritionist Association (AND), and the official website of the Chinese Society of Nutrition, to ensure that the guidelines were comprehensive and authoritative.

2.2.2. Guideline inclusion and exclusion criteria

Inclusion criteria: (1) Guidelines issued by authoritative international or domestic medical organizations, societies, governmental health agencies, or professional associations; (2) Guidelines cover perioperative nutritional management of esophageal cancer patients, including nutritional assessment, screening, nutritional interventions, and nutritional supportive measures; (3) Guidelines are formulated based on systematic reviews, randomized controlled trials, or other high-quality clinical research evidence, and have a clear grade of recommendation; (4) The guidelines were published or updated between 1 January 2016 and 1 May 2024 to ensure the timeliness of the content; (5) Published in Chinese or English for easy understanding and application by researchers.

Exclusion criteria: (1) Guidelines, consensus or review articles written by individuals or non-official organizations are not authoritative; (2) Guidelines do not cover perioperative nutritional management of esophageal cancer or are mainly for patients with other diseases; (3) Guidelines rely only on the opinions of experts or clinical experience, and are not based on systematic reviews or high-quality research evidence, with insufficient evidence-based support; (4) Duplicate content of the included guidelines, or have a lower score on the guideline quality assessment; (5) The guidelines do not meet the criteria for research.

2.2.3. Evaluation of guideline quality and integration of evidence

The quality of the included evidence-based guidelines was assessed by two members of the protocol construction team using the Clinical Guideline Research and Evaluation System (AGREE II). The assessment results were independently entered into Excel by the pair to calculate the standardized scores of each guideline in different domains and to determine the level of recommendation. Meanwhile, the quality assessment tool of the Australian JBI Centre for Evidence-Based Health Care (2017 version) [6] was used to assess the quality of the expert consensus and professional opinion literature. For entries that were in disagreement during the evaluation process, a 3rd team member was involved in the discussion to reach a consensus. To ensure the reliability of the assessment results, the scores of the two evaluators were tested for consistency and the degree of agreement was measured by calculating the intragroup correlation coefficient (ICC). During the intensive reading stage of the guidelines, the two team members extracted relevant evidence from them and merged duplicate entries to remove contradictory or low-quality content. Eventually, the strength of evidence was classified according to the JBI Evidence-Based Practice Centre's criteria for evidence grading and recommendation levels to form the first draft of an evidence-based practice protocol for perioperative nutritional care for esophageal cancer.

2.2.4. Conducting expert group meetings

In the course of the meeting, the Expert Panel considered the first draft of the program line by line and made adjustments to the recommendations based on the quality of evidence, feasibility, effectiveness, and clinical

application value. The secretary is responsible for taking detailed notes of the meeting and making audio recordings for archiving. If there is disagreement on an entry, members of the meeting are required to discuss it together until a consensus is reached before proceeding to the next item. After all entries are revised, the moderator reviews the final revision to ensure that all experts unanimously approve before confirming the final proposal.

3. Results

3.1. Results of the guideline search and quality evaluation

A total of 111 pieces of relevant literature were retrieved in this study, and after screening the titles and abstracts, 27 literatures remained after excluding studies with incompatible types of literature, irrelevant topics, old versions of guides, duplicated literature, and non-compliant languages. After further reading of the full text, 13 documents were excluded for topic incompatibility, unavailability of the original text, translated version of the guidelines, and type non-compliance, and finally, 14 guideline documents were included, of which, two were domestic guidelines and 12 were foreign guidelines. Among the included guidelines, six were evidence-based guidelines and eight were consensus guidelines. After quality assessment, two of the six evidence-based guidelines were recommended at grade A, and four were recommended at grade B. The ICC values of the two evaluators were 0.5 and 0.5, respectively. The ICC value for both assessors was 0.961, indicating high consistency. In addition, the quality assessment of the consensus guidelines all met the inclusion criteria, with an inter-assessor ICC value of 0.885, again with high agreement.

3.2. Evidence is summarized to form a first draft

Based on the summary and analysis of evidence-based and consensus guidelines, a total of 75 evidence and recommendations related to nutritional care were extracted, which were derived from six evidence-based guidelines, and 27 recommendations screened from eight consensus guidelines. Subsequently, the research team conducted a preliminary collation of the collected content, excluding three entries that were controversial about whether percutaneous endoscopic gastrostomy was recommended for nutritional support preoperatively, removing 10 entries with duplicated content, and deleting nine entries that could not be formed into a specific protocol due to a lack of operability. Eventually, the integrated 80 recommendations were classified according to the nursing process and time points, and divided into four stages: admission, preoperative, postoperative, and discharge, to construct the first draft of the nutritional care practice plan applicable to the perioperative period of esophageal cancer patients.

3.3. Expert validation of final drafts

In this expert panel meeting, an in-depth validation of the perioperative nutritional care practice protocol was conducted. It was calculated that the coefficient of expert judgment (Ca) was 0.950, the degree of familiarity (Cs) was 0.875, and the comprehensive authority coefficient reached 0.912, indicating that the expert group had high authority and the opinions provided had a strong reference value. During the meeting, the experts actively discussed and put forward 34 suggestions for revision, including four content additions, 15 entry deletions, seven entry mergers, three content adjustments, and five suggestions for optimizing the program structure. After thorough discussions and revisions, the perioperative nutritional care practice protocol for esophageal cancer patients containing 61 entries was finalized. Among them, 33 entries were assessed as Grade A recommendations,

and 28 entries were classified as Grade B recommendations.

4. Discussion

4.1. Clinical importance of developing a perioperative nutritional care program for esophageal cancer patients

Perioperative nutritional management of esophageal cancer patients is crucial for surgical outcome and postoperative recovery, however, there is a lack of systematic and standardized guidance on the implementation of perioperative nutritional care in clinical practice, which leads to a large discrepancy in the implementation of nutritional interventions, and even affects the recovery process of patients. Therefore, it is of great clinical significance to construct a scientific and standardized perioperative nutritional nursing practice program [7]. First of all, the program can provide an evidence-based basis for healthcare personnel to implement nutritional care more standardized and precise, to optimize the perioperative nutritional management process, and improve the quality of care. Defining the nutritional intervention strategies for each stage of admission, preoperative, postoperative, and discharge can help healthcare professionals assess the nutritional status of patients promptly, adopt individualized intervention measures, and reduce perioperative infections, poor wound healing, and delayed postoperative recovery caused by malnutrition. Secondly, through systematic nutritional care guidance, the program enables patients and their families to understand more clearly the importance of nutritional support and to cooperate with healthcare personnel in making reasonable dietary adjustments to ensure adequate preoperative nutritional reserves and postoperative promotion of recovery, which ultimately improves the prognosis. In addition, through the continuous optimization and improvement of the program, the further development of nutritional care for esophageal cancer can be promoted, the standardization and normalization of clinical care can be facilitated, and the overall quality of patient survival can be improved [8]. This study focused on the perioperative period, the most significant stage of stress and trauma in esophageal cancer patients, and developed a scientific evidence-based practice program for nutritional care. The protocol covers four stages of care, namely admission, preoperative, postoperative, and discharge, and contains a total of 61 entries, aiming to provide a systematic and standardized nursing practice reference for clinical caregivers, optimize perioperative nutritional management, improve the quality of care, and promote patient recovery.

4.2. High clinical applicability of the nutritional care practice program constructed in this study

In constructing the nutritional care practice program in this study, the current situation of medical and nursing resources, cultural background, and baseline characteristics of patients in China were fully considered to ensure that the program had good clinical applicability. During the development of the program, an expert panel meeting was used to critically review the recommendations in the preliminary draft, focusing on assessing their clinical feasibility and practical application value.

For example, in the assessment of nutritional needs at the admission stage, the preliminary draft recommended the use of indirect calorimetry to measure the patient's resting energy expenditure. However, based on the clinical practice in China, the expert group pointed out that equipment such as metabolic carts required for indirect calorimetry is expensive and complicated to operate, and its popularity in domestic healthcare institutions is relatively low, so it is recommended that the simpler Harris-Benedict formula [9]

be used for individualized estimation to improve the operability of the assessment method and the clinical diffusion of the method. For example, for the management of preoperative parenteral nutrition, the preliminary draft suggested that "when parenteral nutrition is administered via a peripheral vein, the osmolality should be controlled within 900 mOsm/L to ensure safety." After discussion, the expert group concluded that the osmolality of parenteral nutrition solution is complicated to calculate, while plasma osmolality or saline osmolality is usually about 300 mOsm/L [10]. Therefore, to simplify the operation and to ensure that clinical caregivers can accurately grasp the standard, the panel recommends that the entry be amended to read, "Parenteral nutritional solutions entered through a peripheral vein are safe up to three times the tension." Through the refinement of the applicability of each entry in the program, it will be more in line with the actual needs of China's medical care environment, thus enhancing the feasibility and promotion value of the program in clinical practice.

5. Conclusion

In conclusion, this study summarized the best evidence of perioperative nutritional care for esophageal cancer through an evidence-based approach and finally formulated an evidence-based practice protocol for perioperative nutritional care for esophageal cancer patients through the deliberation and argumentation of an expert panel. The protocol not only demonstrates scientific rigor but also emphasizes clinical applicability. It provides practical guidance for nursing care, has high reference value, and lays a solid foundation for future promotion and application in clinical settings.

Disclosure statement

The authors declare no conflict of interest.

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