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Editorial Board Member of *World Journal of Gastrointestinal Surgery*, Andrea Cavallaro, MD, PhD, Doctor, Research Assistant Professor, Researcher, Department of Surgery and Medical Surgical Specialties, University of Catania, Catania 95123, Italy. andreacavallaro@tiscali.it

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Preoperative malnutrition in elderly gastric cancer patients and adverse postoperative outcomes of radical gastrectomy

Shan-Shan Liu, Liang Wang

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Shan-Shan Liu, Liang Wang, Department of Gastrointestinal Oncology Surgery, The Affiliated Hospital of Qinghai University, Xi'ning 810000, Qinghai Province, China

Co-first authors: Shan-Shan Liu and Liang Wang.

Corresponding author: Liang Wang, MD, Attending Doctor, Department of Gastrointestinal Oncology Surgery, The Affiliated Hospital of Qinghai University, No. 29 Tongren Road, Xi'ning 810000, Qinghai Province, China. wangliang19911128@163.com

Abstract

Malnutrition is not only a prevalent condition among the elderly but also a common comorbidity in elderly people with gastric cancer (GC). Malnutrition is closely linked to high rates of postoperative complications and poor wound healing in elderly GC patients, which may lead to a higher incidence and mortality rate of GC. Malnutrition decreases the physical function of elderly GC patients after surgery, severely affecting their postoperative life quality and hindering subsequent treatments. This retrospective study was conducted by Zhao *et al*, focusing on the clinical baseline data, postoperative complications, and hospitalization times of elderly GC patients who underwent curative gastrectomy. Additionally, the underlying causes of poor outcomes for patients were discussed. This study may provide a solid basis for the clinical treatment of elderly GC patients in the future. Therefore, malnutrition can serve as a negative prognostic factor for curative surgery in GC patients. Addressing malnutrition and its adverse effects can benefit elderly GC patients from surgical treatment.

Key Words: Elderly gastric cancer patients; Prognostic nutritional index; Preoperative malnutrition; Radical gastrectomy; Adverse postoperative outcome

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Core Tip: Preoperative malnutrition in elderly gastric cancer (GC) patients is linked to poor prognosis, prolonged hospital stay, and delayed discharge. Therefore, malnutrition can serve as a negative predictor of the therapeutic efficacy of radical surgery for GC patients. Improving malnutrition and its adverse effects may effectively benefit elderly GC patients undergoing radical surgery.

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TO THE EDITOR

Gastric cancer (GC) is one of the most deadly cancers, and there are 968000 new cases in 2022 and nearly 660000 deaths globally, ranking fifth worldwide in both incidence and mortality rates[1]. According to the statistics, China accounts for 45% and 50% of the global burden of GC incidence and mortality, respectively[2]. The increasing aging population contributes to the burden of cancer[3]. As the socioeconomy develops and life expectancy prolongs, elderly GC patients are more and more prevalent, which poses an important public health and economic issue for China[4]. Malnutrition has a prevalence of 44% among gastrointestinal surgery patients[5]. GC patients exhibit higher rates of malnutrition than most other cancer patients[6]. This may be attributed to that GC occurs in the digestive tract and often causes symptoms (such as nausea, vomiting, and anorexia), which contribute to low dietary intake or malabsorption and breakdown of proteins and fats, thereby causing malnutrition[7,8]. Furthermore, malnutrition is not only prevalent in the elderly but also is a common complication in elderly GC patients, imposing a heavy burden on the health, society, and elderly care systems[9,10]. In China, the prevalence of malnutrition among elderly individuals is 12.6%[11], which has brought about a significant public health issue[12]. Research has indicated that malnutrition negatively affects the clinical outcomes of elderly GC patients[13]. Additionally, malnutrition is closely associated with postoperative complications and poor wound healing[14]. Consequently, malnutrition leads to higher incidence and mortality rates of elderly GC patients, as well as decreases patients' postoperative physical function, thus significantly affecting their postoperative life quality and hindering subsequent treatments[7,15]. Therefore, it is crucial to pay attention to the preoperative nutrition of elderly GC patients to improve their postoperative outcomes.

The recent article[16] published in the latest issue of the *World Journal of Gastrointestinal Surgery* has captured our keen interest. This study by Zhao *et al*[16] provides valuable insights into assessing the nutritional status of elderly GC patients and implementing effective nutritional interventions accordingly.

The abstract indicates the main contents of the study, and the introduction comprehensively describes the study's background, current state, and significance. In this retrospective study, the study by Zhao *et al*[16] evaluated the clinical baseline data, postoperative complications, and hospitalization times of elderly people with GC who underwent radical surgery from January 2018 to May 2020. Within a week of surgery, the indicators of nutritional status (such as albumin, prealbumin, hemoglobin, and total lymphocyte count) were recorded through laboratory tests. The nutritional status of elderly GC patients was assessed using the prognostic nutritional index (PNI). The overall proportion of malnutrition before surgery was 31.8%. According to the analysis results of nutritional parameters, body mass index, PNI, albumin, prealbumin, and hemoglobin levels in the malnutrition group were notably lower than those in the well-nourished group ($P < 0.05$); however, the total lymphocyte count showed no significant difference between the two groups ($P > 0.05$). It was found that older patients with malnutrition were more vulnerable to postoperative complications than those with normal nutrition ($P < 0.001$). To address malnutrition among elderly GC patients, some patients received preoperative nutritional support. Specifically, 30.8% of malnutrition patients received single-dose nutritional transfusions and 12.4% received total parenteral nutrition (TPN). Among the well-nourished patients, 55.4% underwent single-dose nutritional transfusions, and 3.7% received a TPN transfusion. The proportion of malnutrition patients who received TPN support preoperatively was significantly higher than that in the well-nourished group. In contrast, only 22.1% of malnourished patients received comprehensive nutritional support therapy postoperatively, as compared to 33.5% of well-nourished patients who received comprehensive nutritional support therapy postoperatively ($P = 0.001$). Clinical risk factors (such as patient age, PNI, albumin, prealbumin, surgical duration, and complications) were identified using univariate analysis. According to the Cox multivariate regression analysis results, age ≥ 70 years, PNI < 44.5 , surgical duration ≥ 160 minutes, and complications of grade III and higher were independently associated with prolonged hospitalization. Well-nourished patients showed better clinical outcomes. As compared to well-nourished patients, preoperatively malnourished elderly GC patients showed poorer postoperative outcomes, underscoring the urgency for clinically addressing preoperative malnutrition among this population. Additionally, malnourished patients had a remarkably higher overall incidence of postoperative complications, highlighting the critical importance of optimizing nutritional status in elderly GC patients and providing personalized nutritional support preoperatively. The study results revealed that a low PNI can independently predict a prolonged hospitalization, indicating that PNI can predict short-term and long-term prognosis in elderly patients. Through evaluating the relationship between preoperative nutrition and delayed discharge in elderly people with GC undergoing radical surgery, Zhao *et al*[16] revealed that preoperative malnutrition of elderly GC patients is linked to a poor prognosis, prolonged hospital stay, and delayed discharge of patients; low PNI is identified as an independent risk factor of delayed discharge, which provides a basis for subsequent clinical treatment among this population. Furthermore, the authors elaborated on the fundamental reasons for poor surgical outcomes in elderly GC patients due to preoperative malnutrition and introduced a new hypothesis: Malnutrition may serve as a negative predictor of the efficacy of radical gastrectomy in GC patients. The findings indicate that addressing malnutrition and its adverse effects can efficiently benefit elderly GC patients undergoing radical surgery. The study has to some extent elucidated the correlation between preoperative malnutrition and poor postoperative prognosis in elderly GC patients after radical gastrectomy, achieved its research objectives, and briefly summarized the progress in this field. The

discussion appropriately explains the results, clearly highlights key points, and compares the findings with existing literature. The scientific significance of the study and its relevance to clinical practice were thoroughly discussed. The paper cites relatively new, important, and authoritative references without any issues of self-citation, omission, miscitation, or overcitation, even though some references are somewhat outdated. The manuscript is well-organized, with concise and clear sentences, and accurate and appropriate style, language, and grammar. In conclusion, the manuscript is acceptable and has certain significance.

However, there are several limitations. Firstly, the title of the paper does not clearly reflect the theme or hypothesis of the manuscript. Secondly, some keywords cannot represent the focus of the manuscript. Thirdly, although there are many indicators for assessing the patient's nutritional status, this paper lacks detailed descriptions. Fourthly, subjective factors of the patients may also affect the hospital stay duration, but they are not addressed. Fifthly, as the study is retrospective, prospective studies could be conducted in the future to further validate these results. Finally, the authors fail to evaluate long-term outcomes or determine whether nutritional support preoperatively would affect the clinical outcomes of patients with malnutrition.

Malnutrition is common among elderly GC patients, and appropriate tools for malnutrition assessment are critical for early diagnosis and treatment. Future efforts should focus on strategies to improve clinical outcomes for elderly GC patients with malnutrition. Currently, the diagnosis of malnutrition often relies on the standards established by the Global Leadership Initiative on Malnutrition (GLIM). The European Society for Clinical Nutrition and Metabolism reached a global consensus in 2018 on the core diagnostic criteria for adult malnutrition in clinical settings[17]. Subsequently, GLIM-standardized criteria for malnutrition diagnosis have been widely accepted and applied both domestically and internationally. A study conducted by Skeie *et al*[18] at the Norwegian Gastrointestinal Surgery Registry investigated the occurrence of malnutrition in gastrointestinal surgery patients and its relationship with severe postoperative complications. The results showed that malnourished patients had a 1.29-fold higher risk of severe surgical complications than non-malnourished patients and a 2.15-fold higher risk of death within 30 days. Furthermore, it was noted that preoperative malnutrition was associated with an increased risk of severe surgical complications and postoperative mortality. These findings are consistent with the findings of Xu *et al*[8]. However, contrasting results have also been reported. Li *et al*[19] revealed that there is no significant difference in postoperative complications between patients diagnosed with and without malnutrition according to GLIM criteria. Therefore, further research is needed to substantiate these findings.

GLIM-defined malnutrition is associated with poor prognosis in GC patients[10]. GLIM criteria have been applied for nutritional assessment and survival prediction among elderly cancer patients by Zhang *et al*[20] in 2021. Compared with patients without malnutrition, patients with severe malnutrition defined by GLIM [hazard ratio (HR) 1.71, 1.37-2.14; $P < 0.001$] or moderate malnutrition (HR 1.35, 1.09-1.66; $P < 0.006$) have significantly lower overall survival (OS), which is consistent with the results reported in a meta-analysis[21]. Xu *et al*[8] conducted a retrospective analysis of 886 cases of radical gastrectomy from July 2014 to March 2018. As indicated by their results, 38.3% of patients are diagnosed with malnutrition, with 21.7% experiencing moderate malnutrition and 16.6% experiencing severe malnutrition, according to GLIM criteria. Based on Cox regression analysis results of OS risk measures, stage I malnutrition (HR 1.52; 95%CI: 1.11-2.07; $P = 0.009$) and stage II malnutrition (HR 1.85; 95%CI: 1.34-2.53; $P < 0.001$) are independently associated with OS. Chen *et al*[7] and Li *et al*[19] also reported that GLIM-defined malnutrition was an independent risk factor for poor postoperative OS and disease-free survival of patients. The use of GLIM criteria for diagnosing malnutrition helps predict the adverse clinical prognosis of GC patients post-surgery. Therefore, it is recommended to conduct preoperative nutritional assessments on elderly GC patients to develop optimal treatment plans and improve clinical prognosis following radical gastrectomy.

PNI[22] is an important indicator for assessing malnutrition and has been extensively employed in evaluating the nutrition of GC patients[23,24]. Murakami *et al*[25] proposed that PNI can serve as a predictive indicator for postoperative complications in gastrointestinal surgery, with a PNI < 45 being associated with increased postoperative complications. In 2020, Sugawara *et al*[26] conducted a retrospective analysis of the clinical data of 309 elderly GC patients who underwent radical gastrectomy over a 10-year period. Patients were assessed for PNI scores both preoperatively and 6 months postoperatively, and then categorized into low PNI (< 45) and high PNI (≥ 45) groups. The impact of preoperative and postoperative PNI on the prognosis of elderly GC patients (≥ 75 years) was evaluated. The results showed that a low preoperative PNI was independently associated with a low OS. Multivariate analysis results all indicated that a low postoperative PNI was an independent risk factor of increased GC-related mortality ($P = 0.002$). In 2021, Zhang *et al*[27] explored the prognostic value of PNI in elderly GC surgery patients and demonstrated a significant difference in survival rates between the low PNI and high PNI groups, with the low PNI group showing significantly poorer prognosis than the high PNI group ($P < 0.001$). A high PNI was associated with a longer OS (HR 2.391; 95%CI: 1.652-3.461; $P \leq 0.001$). In this study, preoperative PNI was identified as a crucial independent predictor of poor prognosis after radical gastrectomy in elderly GC patients, which can be used as a sensitive indicator of the prognosis of elderly patients undergoing gastrointestinal tumor surgery. However, the mechanisms of low PNI in affecting the patient's survival are unclear and may involve the following several factors. PNI reflects the body's immune status, and GC patients may experience a systemic inflammatory response after surgery. Furthermore, tumor cells themselves may have immune escape mechanisms, and the reduced immunity further leads to a decrease in the body's ability to recognize and kill tumor cells[28]. In the future, more studies are needed to explore these mechanisms. Additionally, the manuscript does not propose specific measures to improve the malnutrition status of GC patients, which requires further elaboration.

CONCLUSION

In conclusion, the study provides important references for improving preoperative malnutrition in elderly GC patients. Preoperative malnutrition in elderly GC patients is tightly associated with poor prognosis, prolonged hospital stay, and delayed discharge. Therefore, malnutrition can serve as a negative predictor of the therapeutic efficacy of radical surgery for GC patients. Improving malnutrition and its adverse effects can efficiently benefit elderly GC patients undergoing radical surgery.

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Country of origin: China

ORCID number: Liang Wang 0000-0002-4206-5043.

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