INFLUENCE AND ASSESSMENT OF NUTRITIONAL STATUS IN PATIENTS UNDERGOING TREATMENT FOR COLORECTAL CANCER

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Abstract: Introduction: Colorectal cancer (CRC) is one of the most common gastrointestinal malignancies, and patients' nutritional status plays a crucial role in postoperative recovery. Aim: This study aimed to assess the impact of nutritional status on postoperative outcomes in patients undergoing colorectal cancer surgery. Materials and Methods: This observational study included 50 patients who underwent colorectal cancer surgery. Data on anthropometric, laboratory, and clinical parameters were collected, including body weight, BMI, NRS-2002, SGA, and mGPS. Surgical variables such as type and duration of the procedure, as well as postoperative complications classified according to the Clavien–Dindo classification, were also evaluated. Statistical analysis was performed using t-test, χ^2 test, ANOVA, and logistic regression to assess the impact of nutritional status on postoperative outcomes. Results: Anthropometric, laboratory, and clinical parameters were analyzed using validated nutritional screening tools (NRS-2002, SGA). The results showed that patients with higher nutritional risk had prolonged hospital stays and an increased risk of postoperative complications. Inflammatory status, measured by the mGPS score, was significantly correlated with recovery time. Nutritional interventions, including preoperative supplementation, demonstrated potential in improving treatment outcomes. Conclusion: This study confirms the importance of early nutritional screening and individualized nutritional support in reducing postoperative complications and improving the quality of life of patients with colorectal cancer..

Key words: colorectal cancer, nutritional status, nutritional risk, postoperative course, nutritional support

INTRODUCTION

Colorectal cancer (CRC) is one of the most common gastrointestinal malignancies, with significant morbidity and mortality worldwide. Epidemiological data indicate that the incidence of CRC is increasing, which can be attributed to factors such as population aging, changes in dietary habits, and the rising prevalence of obesity. Surgical treatment remains the primary therapeutic option for most patients; however, nutritional status plays a crucial role in treatment outcomes, postoperative recovery, and patients' quality of life.

To understand the importance of nutritional support in surgical patients, it is necessary to know what happens to metabolism during and after surgery. Surgical intervention, as well as trauma, leads to the release of mediators of the systemic inflammatory response, resulting in the catabolism of glycogen, proteins, and fats, with subsequent release of glucose, free fatty acids, and amino acids into the circulation. The result is a loss of muscle mass, which impairs functional recovery after surgery. Preservation of muscle stores, reduction of lipolysis, and glucose oxidation are desirable factors in the postoperative period. Perioperative nutritional support alone has limited impact in the immediate postoperative period, within the first few hours after surgery, when the body is in a catabolic state. Nutritional support and physical activity are essential for the restoration of peripheral muscle mass and functional recovery after major surgery. Optimization of nutrition in moderately malnourished patients should be considered over a period of 7–10 days. In severely malnourished patients, the focus of intervention should be on correcting hypoglycemia, dehydration, electrolyte imbalance, infections, and micronutrient deficiencies. [1].

Definitive surgical treatment (extensive dissections, high-risk anastomoses) is recommended at a later stage, once the infectious focus has been resolved. Malnutrition is common in patients with colorectal cancer, as a result of chronic inflammation due to malignant disease, impaired food intake, renal dysfunction, and liver failure, and it may increase the risk of postoperative complications and prolong hospitalization. The causes of malnutrition in these patients are multifactorial and include reduced food intake due to gastrointestinal symptoms (nausea, vomiting, diarrhea, constipation), metabolic changes associated with malignancy, as well as the consequences of surgical and oncological treatments. Nutritional therapy (support) may also be indicated in patients without obvious, clinically apparent malnutrition as a consequence of the underlying oncological disease, in cases where prolonged interruption or reduction of oral intake is expected [2].

The European Society for Clinical Nutrition and Metabolism (ESPEN) recommends systematic assessment of nutritional status and implementation of targeted nutritional interventions to improve treatment outcomes. Enteral and parenteral nutrition, oral nutritional supplements (ONS), and individualized nutritional approaches can significantly improve nutritional status and reduce postoperative complications. [3].

Preoperative nutritional support may reduce postoperative infections and improve wound healing, while an adequate perioperative nutritional strategy can contribute to faster recovery and a reduction in hospital treatment costs. [2].

ESPEN has redefined the criteria for the assessment of malnutrition based on two criteria:
BMI < 18.5 kg/m^2.
Total body weight loss > 10% or > 5% within the last three months, together with a reduced BMI. [2].

Disease-related malnutrition (DRM) is a subcategory according to the WHO, characterized by malnutrition with a BMI < 18.5 kg/m^2. The assessment of metabolic risk in DRM can be easily identified using NRS-2002. Recent studies have shown that preoperative albumin levels and body weight loss have a significant impact on postoperative outcomes and complication rates. [4].

Assessment of nutritional status in patients undergoing colorectal cancer surgery requires a multidisciplinary approach, including anthropometric, laboratory, and clinical parameters. The use of validated screening tools, such as the Nutritional Risk Screening (NRS-2002) and the Subjective Global Assessment (SGA), enables early identification of patients at increased nutritional risk and timely intervention. In addition, biochemical markers such as albumin, prealbumin, and C-reactive protein (CRP) play an important role in assessing nutritional status and predicting postoperative outcomes. [5].

The modified Glasgow Prognostic Score (mGPS), as an indicator of inflammation and nutrition, has previously been recognized as an important predictor of overall survival. mGPS, as an indicator of systemic inflammatory response, is significantly associated with metastatic disease. Some studies show a significantly lower five-year survival rate of 35.2% for mGPS 2 compared to 91.5% for mGPS 0. A higher mGPS is also associated with malnutrition. mGPS is an independent predictor of the incidence of surgical site infections (SSI). This complication may be associated with anastomotic dehiscence, which not only prolongs postoperative hospital stay but also increases the risk of disease recurrence. [7].

Aim

The aim of this study is to evaluate the impact of nutritional status on the postoperative course in patients with colorectal cancer, as well as to assess the effectiveness of different nutritional strategies in improving treatment outcomes.

Materials and Methods

This is a prospective observational study conducted at the Department of Surgery of the Military Medical Academy from January 2024 to March 2025 in patients operated on for colorectal cancer. The sample included patients who underwent a 7-day preoperative nutritional preparation, and data were analyzed in the postoperative recovery period during the same hospitalization. The inclusion criteria for the study were: Patients with histopathologically confirmed colorectal cancer. Patients undergoing surgical treatment. Availability of data on preoperative nutritional status.

Demographic, clinical, and laboratory parameters were analyzed, including anthropometric measures such as body weight and body mass index (BMI); nutritional status assessed by NRS-2002 and SGA; inflammatory status evaluated using mGPS; surgical data including type of operation, duration of the procedure, and blood loss; the Clavien–Dindo classification of postoperative complications; and postoperative outcomes such as length of hospital stay and complication rates.

The obtained data were analyzed using descriptive and inferential statistics. The monitored parameters in patients with preoperative nutritional preparation were compared, and the significance of differences was assessed using Student's t-test, χ^2 test, logistic regression, and correlation analysis..

This methodological framework enables the assessment of the impact of nutritional status on the postoperative course and the potential benefits of preoperative nutritional preparation..

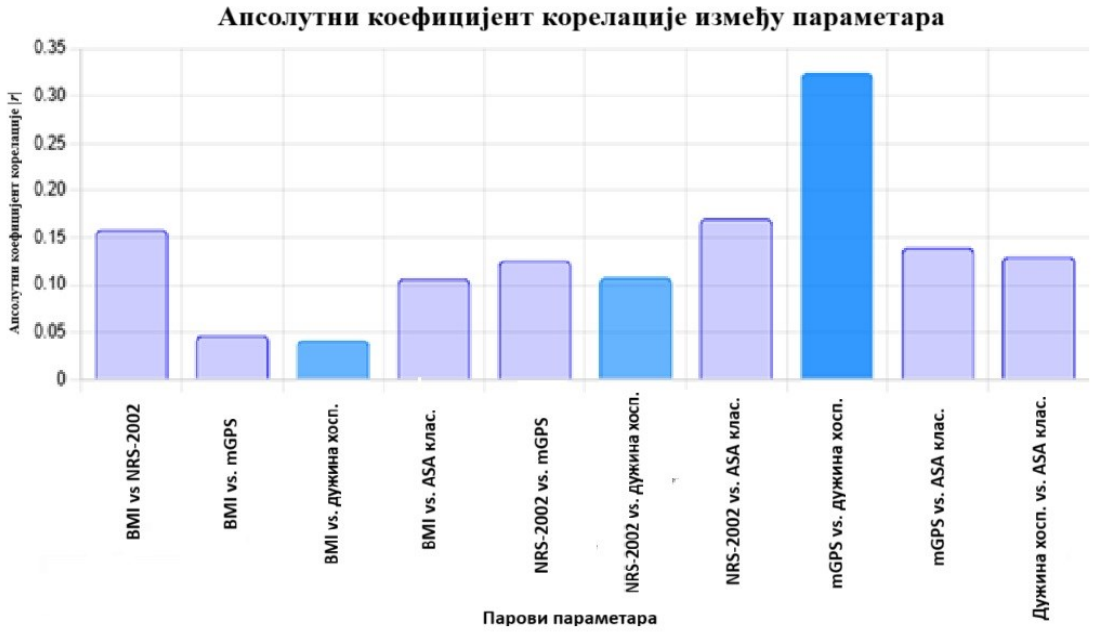
The study was approved by the Ethics Committee of the Military Medical Academy under number 132/2025 on September 25, 2025.

Results

Table 1. – Parameters Monitored in the Study and Their Mean, Minimum, and Maximum Values

Parameter	Mean value	Minimum value	Maximum value
Number of participants	50	/	/
Sex (M/F)	30/20	/	/
BMI	23.8	18.5	29.7
NRS-2002	2.1	0	4
*ASA*classification	1.9	1	3
mGPS	0.8	0	2
Clavien-Dindo	1.2	1	3
Length of hospital stay (days)	9.1	6	14

Table 2 – The height of the bars indicates the strength of the correlation (higher |r| = stronger relationship). Darker color indicates statistically significant associations.



These results indicate the following relationships:

• There is a weak positive correlation between BMI and NRS-2002, which may suggest that patients with higher BMI have a higher nutritional risk.

• The strongest positive correlation is between mGPS and length of hospital stay (0.3239), suggesting that inflammatory status may play a role in the duration of hospitalization.

t-test for BMI and length of hospital stay

• t-statistic: 157.85

• p-value: 9.20×10^{-120}

• p-value: < 0.05

• This result indicates a statistically significant association between BMI and length of hospital stay ($p < 0.05$), although the correlation coefficient suggests a weak negative relationship.

ANOVA test for NRS-2002 and length of hospital stay

• F-statistic: 2509.59

• p-value: 1.22×10^{-71}

• p-value: < 0.05

• There is a highly significant association between assessed nutritional risk (NRS-2002) and postoperative length of hospital stay, with strong statistical significance.

DISCUSSION

Colorectal cancer (CRC) is the third most common cancer and the fourth leading cause of cancer-related death [8]. Nutritional status is a very important indicator for predicting postoperative survival outcomes in CRC, and monitoring nutritional status is a common criterion used in treatment follow-up [9]. In this study, we demonstrated that nutritional status significantly affects the postoperative course in patients with CRC. Data analysis indicated a trend showing that patients with higher nutritional risk (NRS-2002 ≥ 3) have a longer postoperative hospital stay. Additionally, a negative correlation was observed between BMI and length of hospital stay, suggesting that patients with lower BMI values experience slower postoperative recovery [10]. The results indicate that lower BMI values, within the range of malnutrition, prolong the duration of postoperative recovery..

Some studies suggest that a high mGPS has a negative impact on survival in patients with colorectal cancer. In a meta-analysis, Tsung-Hsien Wu reviewed the existing evidence on the practicality of mGPS and confirmed its accuracy in predicting cancer prognosis. [11].

The systemic inflammatory response in patients, measured using the mGPS scale, showed a significant impact on the length of hospital stay, highlighting the importance of systemic inflammation in the postoperative period. In addition, the ASA classification was also correlated with the length of hospitalization, with patients in higher ASA classes experiencing longer recovery [12]. Furthermore, results from similar studies have shown that patients with a pronounced inflammatory response (elevated CRP, hypoalbuminemia) have an increased risk of postoperative complications and a longer recovery period [13]. This is consistent with our findings, where patients with higher mGPS scores had prolonged postoperative recovery.

Nutritional interventions, such as preoperative oral nutritional supplementation, have shown potential in reducing postoperative hospital stay and decreasing complication rates, which is consistent with previous research and ESPEN guideline recommendations. [2].

Comparing the results of our study with the available literature, it is evident that our findings are consistent with studies emphasizing the importance of nutritional screening and interventions. A study conducted in the United Kingdom showed that patients with malnutrition have a 30% longer hospital stay and a higher rate of postoperative complications compared to patients with adequate nutritional status [14]. Similarly, a study from Germany indicated that the implementation of an individualized nutritional protocol can reduce postoperative infections by 25% [15]. These findings support the importance of early nutritional intervention, which is also confirmed by our data..

CONCLUSION

It is stated here that the nutritional status of patients with colorectal cancer plays a key role in the postoperative course and treatment outcomes. Early screening of nutritional status and the implementation of individualized nutritional strategies may contribute to reducing postoperative complications and promoting faster patient recovery..

Further research aimed at determining the optimal duration of preoperative nutritional therapy and the implementation of personalized nutritional interventions is necessary in order to further improve treatment outcomes and the quality of life of patients with colorectal canc.

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The authors declare that they have no conflicts of interest..