

UDK 613.24:616.34/.35-006.6-056.24"2024/2025"
COBISS.SR-ID 191747337

UTICAJ I PROCENA NUTRITIVNOG STATUSA KOD PACIJENATA KOJI SE LEČE OD KOLOREKTALNOG KARCINOMA

Ivan Pantić (1,4), Srđan Petković (2,4), Milan Sibinović (1), Saša Dragović (1), Mihailo Bezmarević (1,3,4), Milan Jovanović (1,3), Boško Milev (1,3)

1) KLINIKA ZA OPŠTU HIRURGIJU, VOJNOMEDICINSKA AKADEMIJA, BEOGRAD, SRBIJA; 2) ODELJENJE ZA OPŠTU HIRURGIJU, VOJNA BOLNICA NOVI SAD, NOVI SAD, SRBIJA; 3) MEDICINSKI FAKULTET VOJNOMEDICINSKE AKADEMIJE, UNIVERZITET ODBRANE, BEOGRAD, SRBIJA; 4) NACIONALNO DRUŠTVO ZA KLINIČKU ISHRANU SRBIJE (NUPENS), BEOGRAD, SRBIJA

Sažetak: Uvod: Kolorektalni karcinom (KRK) je jedan od najčešćih maligniteta gastrointestinalnog trakta, a nutritivni status pacijenata igra ključnu ulogu u postoperativnom oporavku. **Cilj:** Ova studija je imala za cilj da proceni uticaj nutritivnog statusa na postoperativne ishode kod pacijenata koji su podvrgnuti operaciji KRK. **Materijal i metode:** Ova opservaciona studija obuhvatila je 50 pacijenata koji su podvrgnuti operaciji kolorektalnog karcinoma. Podaci su prikupljeni o antropometrijskim, laboratorijskim i kliničkim parametrima, uključujući telesnu težinu, BMI, NRS-2002, SGA i mGPS. Takođe su procenjene hirurške varijable kao što su vrsta i trajanje procedure i Clavien-Dindo klasifikacija komplikacija. Statistička analiza je sprovedena korišćenjem t-testa, χ^2 testa, ANOVA i logističke regresije kako bi se procenio uticaj nutritivnog statusa na postoperativne ishode. **Rezultati:** Antropometrijski, laboratorijski i klinički parametri su analizirani korišćenjem validiranih alata za skrining nutritivnog statusa (NRS-2002, SGA). Rezultati su pokazali da su pacijenti sa većim nutritivnim rizikom imali produženu hospitalizaciju i povećan rizik od postoperativnih komplikacija. Inflamatorni status, meren mGPS skorom, značajno je korelirao sa trajanjem oporavka. Nutritivne intervencije, uključujući preoperativnu suplementaciju, pokazale su potencijal u poboljšanju ishoda lečenja. **Zaključak:** Ova studija potvrđuje važnost ranog nutritivnog skrininga i individualizovane nutritivne podrške u smanjenju postoperativnih komplikacija i poboljšanju kvaliteta života pacijenata sa kolorektalnim karcinomom.

Ključne reči: kolorektalni karcinom, nutritivni status, nutritivni rizik, postoperativni tok, nutritivna podrška

UVOD

Kolorektalni karcinom (KRK) je jedan od najčešćih maligniteta gastrointestinalnog trakta, sa značajnim morbiditetom i mortalitetom širom sveta. Prema epidemiološkim podacima, incidenca KRK je u porastu, što se može pripisati faktorima kao što su starenje populacije, promene u prehrambenim navikama i povećana prevalencija gojaznosti. Hirurško lečenje ostaje primarna terapijska opcija za većinu pacijenata; međutim, nutritivni status igra ključnu ulogu u ishodima lečenja, postoperativnom oporavku i kvalitetu života pacijenata.

Da bismo razumeli značaj nutritivne podrške kod hirurških pacijenata, moramo znati šta se dešava sa metabolizmom tokom i posle operacije. Hirurška intervencija, kao i trauma, dovodi do oslobađanja medijatora sistemskog inflamatornog odgovora, što dovodi do katabolizma glikogena, proteina i masti sa

posledičnim oslobađanjem glukoze, slobodnih masnih kiselina i aminokiselina u cirkulaciju. Rezultat je gubitak mišićne mase koji ometa funkcionalni oporavak nakon operacije. Zaštita mišićnih depoa, smanjenje lipolize i oksidacija glukoze su poželjni faktori u postoperativnom periodu. Perioperativna nutritivna podrška sama po sebi nema veliki uticaj u neposrednom postoperativnom periodu, prvih nekoliko sati nakon operacije, kada je telo u stanju katabolizma. Nutritivna podrška i fizička aktivnost su neophodni za obnavljanje periferne mišićne mase i funkcionalni oporavak nakon velike operacije. Mora se razmotriti optimizacija ishrane kod umereno neuhranjenih pacijenata tokom 7-10 dana. Kod teško neuhranjenih pacijenata, fokus intervencije treba da bude na rešavanju hipoglikemije, dehidracije, elektrolitskog disbalansa, infekcija, nedostatka mikronutrijenata [1].

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

Ivan Pantić (1,4), Srđan Petković (2,4), Milan Sibinović (1), Saša Dragović (1), Mihailo Bezmarević (1,3,4), Milan Jovanović (1,3), Boško Milev (1,3)

1) CLINIC FOR GENERAL SURGERY, MILITARY MEDICAL ACADEMY, BELGRADE, SERBIA; 2) DEPARTMENT OF GENERAL SURGERY, MILITARY HOSPITAL NOVI SAD, NOVI SAD, SERBIA; 3) FACULTY OF MEDICINE OF THE MILITARY MEDICAL ACADEMY, UNIVERSITY OF DEFENCE, BELGRADE, SERBIA; 4) NATIONAL SOCIETY FOR CLINICAL NUTRITION OF SERBIA (NUPENS), BELGRADE, SERBIA

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,

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].

Definitivno hirurško lečenje (opsežne disekcije, rizične anastomoze) preporučuje se u kasnijoj fazi kada je žarište infekcije izlečeno. Neuhranjenost je česta kod pacijenata sa kolorektalnim karcinomom, kao posledica hronične upale usled maligne bolesti, poremećenog unosa hrane, poremećene funkcije bubrega i otkazivanja jetre, i može povećati rizik od postoperativnih komplikacija i produžiti hospitalizaciju. Uzroci neuhranjenosti kod ovih pacijenata su multifaktorski i uključuju smanjen unos hrane zbog gastrointestinalnih simptoma (mučnina, povraćanje, dijareja, zatvor), metaboličke promene povezane sa malignitetom, kao i posledice hirurških i onkoloških tretmana. Nutritivna terapija (podrška) može biti indikovana i kod pacijenata koji nemaju očiglednu, vidljivu malnutriciju kao posledicu osnovne onkološke bolesti, u slučajevima kada se očekuje prekid ili smanjenje oralnog unosa tokom dužeg perioda [2].

Evropsko društvo za kliničku ishranu i metabolizam (*ESPEN*) preporučuje sistematsku procenu nutritivnog statusa i sprovođenje ciljanih nutritivnih intervencija radi poboljšanja ishoda lečenja. Enteralna i parenteralna ishrana, oralni nutritivni suplementi (ONS) i individualizovani nutritivni pristupi mogu značajno poboljšati nutritivni status i smanjiti postoperativne komplikacije [3].

Preoperativna nutritivna podrška može smanjiti postoperativne infekcije i poboljšati zarastanje rana, dok adekvatna perioperativna nutritivna strategija može doprineti bržem oporavku i smanjenju troškova bolničkog lečenja [2].

ESPEN je redefinisao kriterijume za procenu neuhranjenosti na osnovu dva kriterijuma:

1. BMI < 18,5 kg/m².
2. Ukupan gubitak telesne mase > 10% ili > 5% u poslednja tri meseca zajedno sa smanjenjem BMI [2].

Neuhranjenost povezana sa bolešću (*DRM*) je podkategorija prema SZO, koju karakteriše neuhranjenost sa BMI < 18,5 kg/m². Procena metaboličkog rizika kod *DRM* može se lako otkriti pomoću *NRS 2002*. Nedavne studije su pokazale da preoperativni nivoi albumina i gubitak TM imaju značajan uticaj na postoperativni ishod i stopu komplikacija [4].

Procena nutritivnog statusa kod pacijenata koji se podvrgavaju operaciji kolorektalnog karcinoma zahteva multidisciplinarni pristup, uključujući antropometrijske, laboratorijske i kliničke parametre. Upotreba validiranih alata za skrining, kao što su skrining nutritivnog rizika (*NRS 2002*) i Subjektivna globalna procena (*SGA*), omogućava ranu identifikaciju pacijenata sa povećanim nutritivnim rizikom i blagovremenu intervenciju. Pored toga, biohemijski markeri, kao što su albumin, prealbumin i C-reaktivni protein (*CRP*), igraju važnu ulogu u proceni nutritivnog statusa i predviđanju postoperativnih ishoda [5].

Modifikovani Glazgov prognostički skor (*mGPS*), kao indikator inflamacije i nutricije, ranije je prepoznat kao važan prediktor ukupnog preživljavanja. *mGPS*, kao indikator sistemskog inflamatornog odgovora, značajno je povezan sa metastatskom bolešću. Neke studije pokazuju značajno nižu petogodišnju stopu preživljavanja od 35,2% za *mGPS* 2 u poređenju sa 91,5% za *mGPS* 0. Viši *mGPS* je, takođe, povezan sa malnutricijom [6]. *mGPS* je nezavisni prediktor učestalosti postoperativne infekcije hirurškog mesta (*SSI*). Komplikacija koja može biti povezana sa dehiscencijom anastomoze, što ne samo da produžava postoperativni boravak u bolnici već i povećava rizik od recidiva bolesti [7].

CILJ

Cilj ove studije je ispitivanje uticaja nutritivnog statusa na postoperativni tok kod pacijenata sa kolorektalnim karcinomom, kao i procena efikasnosti različitih nutritivnih strategija u poboljšanju ishoda lečenja.

MATERIJAL I METODE

Ovo je prospektivna opservaciona studija sprovedena na Hirurškom odeljenju Vojnomedicinske akademije od januara 2024. do marta 2025. godine na pacijentima operisanim zbog kolorektalnog karcinoma. Uzorak je obuhvatio pacijente sa preoperativnom nutritivnom pripremom tokom 7 dana, a podaci su analizirani u postoperativnom periodu oporavka, tokom iste hospitalizacije. Kriterijumi za uključivanje pacijenata u studiju bili su: 1. Pacijenti sa potvrđenim histopatološkim nalazima kolorektalnog karcinoma 2. Pacijenti koji se podvrgavaju hirurškom lečenju 3. Dostupni podaci o preoperativnom nutritivnom statusu.

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/m².

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/m². 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.

Analizirani su demografski, klinički i laboratorijski parametri, uključujući antropometrijske mere: telesna masa, indeks telesne mase (ITM), nutritivni status: *NRS-2002*, *SGA*, inflamatorni status: *mGPS*, hirurški podaci: vrsta operacije, trajanje intervencije, gubitak krvi, *Clavien-Dindo* klasifikacija postoperativnih komplikacija, postoperativni ishodi: dužina hospitalizacije, učestalost komplikacija.

Dobijeni podaci su analizirani korišćenjem deskriptivne i inferencijalne statistike. Praćeni parametri kod pacijenata sa preoperativnom nutritivnom pripremom su

upoređeni, a značajnost razlika je ispitana korišćenjem Studentovog *t*-testa, χ^2 testa, logističke regresije i korelacije.

Ovaj metodološki okvir omogućava procenu uticaja nutritivnog statusa na postoperativni tok i potencijalne koristi preoperativne nutritivne pripreme.

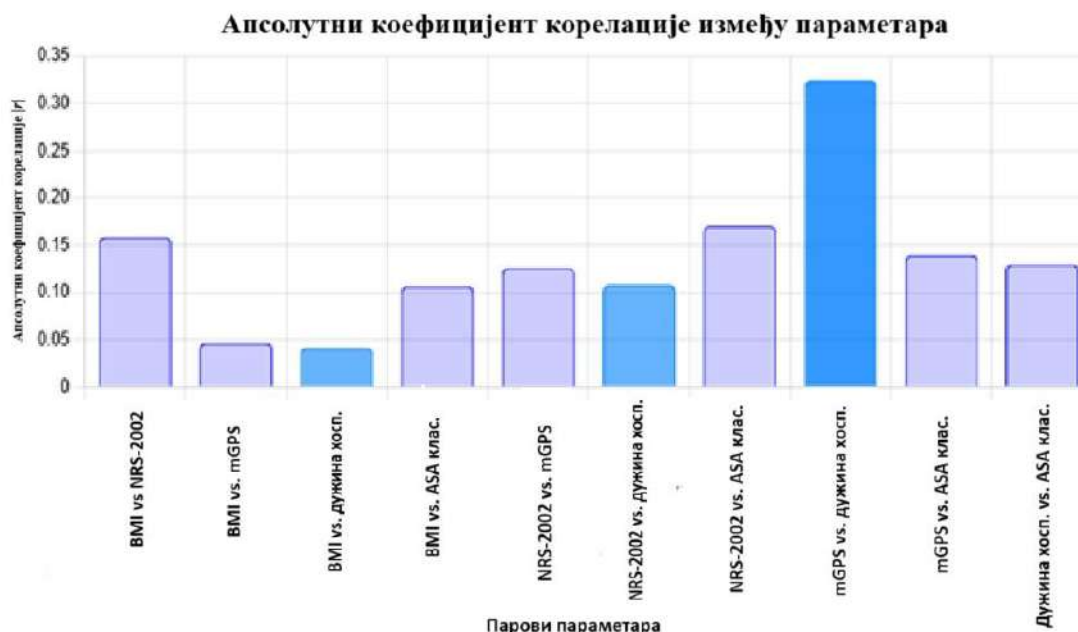
Istraživanje je odobreno od strane Etičkog komiteta Vojnomedicinske akademije pod brojem 132/2025 od 25. septembra 2025. god.

REZULTATI

Tabela 1. - Parametri praćeni u studiji i njihove prosečne, minimalne i maksimalne vrednosti

Parametar	Srednja vrednost	Minimalna vrednost	Maksimalna vrednost
Broj ispitanika	50	/	/
Pol (M/Ž)	30/20	/	/
BMI	23.8	18.5	29.7
<i>NRS-2002</i>	2.1	0	4
<i>ASA</i> classification	1.9	1	3
<i>mGPS</i>	0.8	0	2
<i>Clavien-Dindo</i>	1.2	1	3
Dužina hospitalizacije (dani)	9.1	6	14

Tabela 2. - Visina stubova označava jačinu korelacije (veći $|r|$ = jača veza). Tamnija boja označava statistički značajne veze.



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..

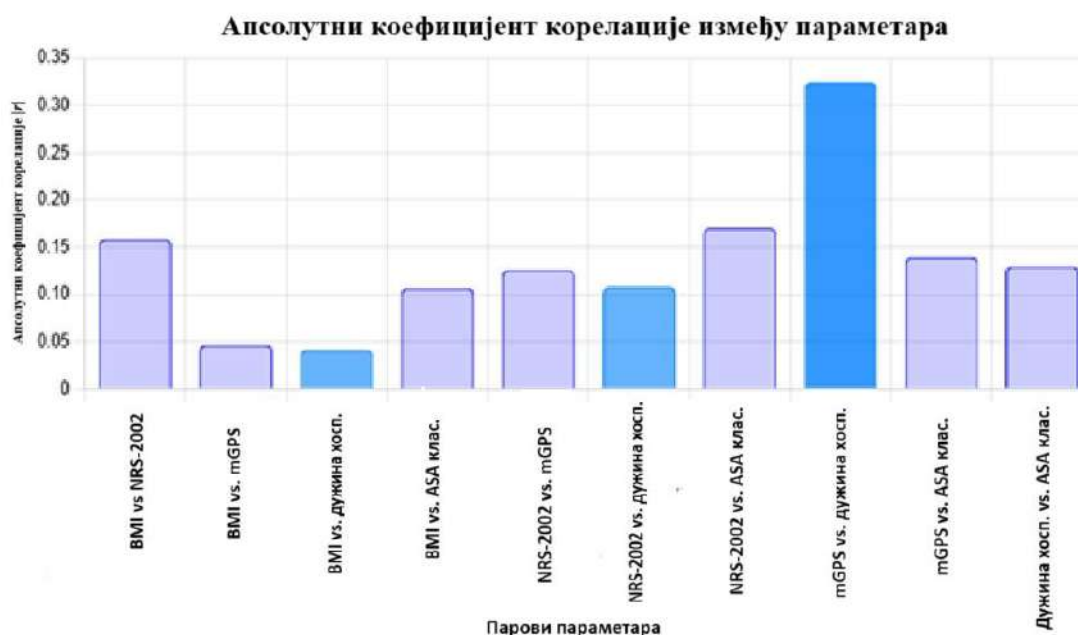
The study was approved by the Ethics Committee of the Military Medical Academy under number 132/2025 on September 25, 2025.

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.



Ovi rezultati ukazuju na sledeće veze:

- Postoji blaga pozitivna korelacija između BMI i *NRS 2002*, što može ukazivati na to da pacijenti sa višim BMI imaju veći nutritivni rizik.

- Najjača pozitivna korelacija je između *mGPS* i dužine boravka u bolnici (0,3239), što sugeriše da inflamatorni status može igrati ulogu u dužini boravka u bolnici.

o T-test za BMI i dužinu hospitalizacije

- T-statistika: 157,85

- *p*-vrednost: $9,20 \times 10^{-120}$

- *p*-vrednost: <0,05

- Ovaj rezultat ukazuje na statistički značajnu vezu između BMI i dužine hospitalizacije (*p*<0,05), iako koeficijent korelacije sugeriše slabu negativnu vezu.

o ANOVA test za *NRS 2002* i dužinu boravka u bolnici

- *F*-statistika: 2509,59

- *p*-vrednost: $1,22 \times 10^{-71}$

- *p*-vrednost: <0,05

- Veoma značajna povezanost procenjenog nutritivnog rizika (*NRS-2002*) sa dužinom postoperativnog boravka, sa statističkom značajnošću.

DISKUSIJA

Kolorektalni karcinom (KRK) je treći najčešći karcinom i četvrti najčešći uzrok smrti povezane sa malignitetom [8]. Nivo ishrane je veoma važan pokazatelj za predviđanje ishoda postoperativnog preživljavanja kod KRK, a kontrolni nutritivni status je uobičajeni kriterijum koji se koristi u praćenju lečenja [9]. U ovoj studiji smo pokazali da nutritivni status značajno utiče na postoperativni tok kod pacijenata sa KRK. Analiza podataka je ukazala na trend koji pokazuje da pacijenti sa višim nutritivnim rizikom (*NRS-2002* ≥ 3) imaju duži postoperativni boravak. Takođe, primećena je negativna korelacija između BMI i dužine hospitalizacije, što sugeriše da pacijenti sa nižim vrednostima BMI imaju sporiji postoperativni oporavak [10]. Rezultati ukazuju da niže vrednosti BMI, u rasponu neuhranjenosti, produžavaju dužinu postoperativnog oporavka.

Neke studije sugerišu da visok *mGPS* negativno utiče na preživljavanje kod pacijenata sa KRK. U meta-analizi, *Tsung-Hsien Wuje* pregledao postojeće dokaze o praktičnosti *mGPS*-a i potvrdio njegovu tačnost za predviđanje prognoze raka [11].

Sistemska inflamatorni odgovor pacijenata, mereno *mGPS* skalom, pokazalo je značajan uticaj na dužinu hospitalizacije, što ukazuje na važnost sistemskog inflamatornog odgovora u postoperativnom periodu. Pored toga, *ASA* klasifikacija je, takođe, bila u korelaciji sa dužinom hospitalizacije, pri čemu pacijenti sa višom *ASA* klasifikacijom imaju duži oporavak [12]. Pored toga, rezultati sličnih studija pokazali su da pacijenti sa izraženim inflamatornim odgovorom (povišen *CRP*, hipoalbuminemija) imaju povećan rizik od postoperativnih komplikacija i duži period oporavka [13]. Ovo je u skladu sa našim nalazima, gde su pacijenti sa višim *mGPS* skorom imali duži postoperativni oporavak.

Nutritivne intervencije, kao što je preoperativna oralna nutritivna suplementacija, pokazale su potencijal u skraćivanju vremena postoperativne hospitalizacije i smanjenju komplikacija, što je u skladu sa prethodnim istraživanjima i preporukama *ESPEN* smernica [2].

Upoređujući rezultate naše studije sa dostupnom literaturom, primećuje se da su naši nalazi u skladu sa radovima koji naglašavaju važnost nutritivnog skrininga i intervencija. Studija sprovedena u Ujedinjenom Kraljevstvu pokazala je da pacijenti sa malnutricijom imaju 30% duže vreme hospitalizacije i veću stopu postoperativnih komplikacija u poređenju sa pacijentima sa adekvatnim nutritivnim statusom [14]. Slično tome, studija iz Nemačke je ukazala da primena individualizovanog nutritivnog protokola može smanjiti postoperativne infekcije za 25% [15]. Ovi nalazi podržavaju važnost rane nutritivne intervencije, što potvrđuju i naši podaci.

ZAKLJUČAK

Ovde se navodi da nutritivni status pacijenata sa kolorektalnim karcinomom igra ključnu ulogu u postoperativnom toku i ishodima lečenja. Rani skrining nutritivnog statusa i primena individualizovanih nutritivnih strategija mogu doprineti smanjenju postoperativnih komplikacija i bržem oporavku pacijenata.

Dalja istraživanja u smislu određivanja optimalnog trajanja preoperativne nutritivne terapije i primene personalizovanih nutritivnih intervencija su neophodna kako bi se dodatno poboljšali ishodi lečenja i kvalitet života pacijenata sa kolorektalnim karcinomom.

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.

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Autori izjavljaju da nemaju sukobe interesa.

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 cancer.

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