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The effect of perioperative nutritional support on readmission ratios in elective major abdominal surgery

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ABSTRACT

Objective: Postoperative results will be poor when major surgeries are performed on patients with malnutrition. Therefore, it is recommended in the perioperative period to provide nutritional support (NS) to patients with malnutrition for surgeries especially for cancer. Although different opinions on the timing of NS continue, data on the effect of this treatment on readmission rates are also insufficient.

Methods: A study was planned on patients undergoing resective surgery for intraabdominal malignancy between January 2010 and December 2018. Patients who were given preoperative oral nutritional supplementation (ONS) constituted group A and those who were given perioperative NS constituted group B. Demographic data, comorbidities, preoperative prealbumin values, surgeries performed, postoperative complications, length of hospital stay, rehospitalization rates within the first 30 days after discharge, and prealbumin values at readmission were compared between the 2 groups.

Results: The data of 371 patients (157 in group A and 214 in group B) who met the inclusion criteria for the study were evaluated. No statistical difference was found between the 2 groups in terms of demographic data and comorbid diseases. Postoperative complications were observed in 42 patients (26.7%) in group A and in 53 patients (24.7%) in group B ($p>0.05$). The number of patients who developed problems requiring rehospitalization within the first 30 days was 18 (11.4%) in group A and 11 (5.1%) in group B ($p<0.05$). The number of patients with more than 5% weight loss at the time of readmission compared with the day of discharge was 9 (50%) in group A and 1 (20%) in group B ($p<0.05$). A statistical difference was found in prealbumin levels at the time of readmission ($p<0.05$).

Conclusion: NS treatment, which is started in the preoperative period and continued postoperatively, has more positive effects on readmission rates and postoperative nutritional status.

Keywords: Malnutrition, nutritional support, readmission, surgery

Introduction

Nutritional care is one of the most important aspects of hospital treatments. The basis of this care covers the screening of the nutritional status, creating a good nutrition plan, and providing proper and accurate nutritional support (NS) to patients with malnutrition. Malnutrition rates are between 10% and 35% in patients hospitalized in general surgery clinics (1-5). When the patients who will undergo cancer surgery are evaluated, these rates increase to 50% to 80% (3, 4, 6, 7). It has been proven that postoperative results will be poor if patients with malnutrition are operated, mortality and morbidity will increase, intensive care stay and hospital stay will be longer, and the outcomes even after hospital discharge will be negatively affected (8, 9). Therefore, evaluation of the nutritional status of all hospitalized patients and providing NS to patients with nutritional deficits are recommended. However, discussions about the timing of giving NS to patients who are planned to undergo cancer surgery are still ongoing. Although the generally accepted opinion is that perioperative NS will affect the results more positively, some authors only advocate preoperative NS; however, few clinicians claim that it is not correct to delay cancer surgeries and that giving NS postoperatively will be sufficient after patients are operated immediately (1, 10, 11).

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Operations performed for tumors of intraabdominal solid organs are generally difficult and have high postoperative morbidity and mortality. Therefore, surgeons usually concentrate on the period that patients spend in the hospital, and the period after discharge is somewhat ignored. Although patients are often invited for purposes, the goal here is mostly to monitor surgical problems, and nutritional assessment and follow-up are of secondary importance or forgotten in many patients.

When English-language literature is examined, many studies on the effect of NS on postoperative outcomes in patients with or without malnutrition or on the effect of NS on results in patients with cancer can be found. However, there is no research examining the relationship between NS and rehospitalization in patients discharged after resective surgeries for solid tumors of intraabdominal organs. We planned a study to provide a perspective on the deficiency on this matter.

Methods

This study, which was performed with the evaluation and analysis of data between January 2010 and December 2018, started with the approval of Atatürk Training and Research Hospital Ethics Committee (approval no. 2018/17). Patients who underwent resective surgery for intraabdominal malignancy were included in the study. Exclusion criteria were as follows: emergency surgeries, palliative surgeries, an nutritional risk screening 2002 (NRS-2002) score of less than 3, provided with preoperative total parenteral nutrition, problems in preoperative NS plan, an American Society of Anesthesiologists score of 3–4, undergoing multiple organ resections, becoming exitus within the first 30 days, and a deficiency in their records. Patients who received only preoperative oral nutritional supplementation (ONS) constituted group A, and those who received perioperative NS constituted group B.

Demographic data, comorbidities, preoperative prealbumin values, surgeries performed, postoperative complications, length of hospital stay (LOS), readmission rates within the first 30 days after discharge, and prealbumin values at admission were compared between the 2 groups.

Statistical analysis

The chi-square test was used for statistical comparisons, and $p<0.05$ was considered statistically significant.

Results

The data of 371 patients who met the inclusion criteria were evaluated. There were 157 patients in group A and 214 patients in group B. No statistical difference was found between the 2 groups in terms of demographic data and comorbid diseases (Table 1). The applied surgical procedures are presented in Table 2. Postoperative complications were observed in 42 patients (26.7%) in group A and in 53 patients (24.7%) in group

Table 1. Patient characteristics

	Group A	%	Group B	%	p
Male	82	52.2	115	53.7	>0.05
Female	75	47.8	99	46.3	>0.05
Age	42 (31–83)		44 (29–78)		>0.05
Comorbidity	43	27.3	58	27.1	>0.05
Prealbumin levels at admission	15.2±7.6		16.8±5.1		>0.05

Table 2. Distribution of performed surgeries according to the groups

Surgery	Group A (n)	%	Group B (n)	%	p
Esophagectomy	4	2.5	5	2.3	>0.05
Subtotal gastrectomy	24	15.2	33	15.4	>0.05
Total gastrectomy	23	14.6	34	15.8	>0.05
Right hemicolectomy	21	17.8	40	18.6	>0.05
Left hemicolectomy	31	19.7	34	15.8	>0.05
Lower anterior resection	15	9.5	22	11.2	>0.05
Abdominoperineal resection	21	13.3	31	14.4	>0.05
Whipple procedure	11	7	15	7	>0.05

B (p>0.05). The mean postoperative hospital stay was 9.2 days in group A and 9.7 days in group B (p>0.05). The number of patients who developed problems requiring rehospitalization within the first 30 days was 18 (11.4%) in group A and 11 (5.1%) in group B (p<0.05). The number of patients with more than 5% weight loss at readmission compared with the day of discharge was 9 (50%) in group A and 1 (20%) in group B (p<0.05). Meanwhile, when the prealbumin values studied (normal, 17–42 mg/dL) were compared, the mean value was 15.1 mg/dL in group A, whereas 19.4 mg/dL in group B (P<0.05). There was no difference between the prealbumin values of patients in both groups during the preoperative hospitalization. At readmission, it was found that 9 of 11 patients in group B discontinued the use of ONS earlier than recommended.

Discussion

Although the primary disease of patient such as cancer, trauma, inflammation, obstruction, or fistula is the main cause of malnutrition present in an average of one-third of patients hospitalized in general surgery clinics, additional risk factors include advanced age, preexisting chronic disease, and low socioeconomic status. In addition, iatrogenic malnutrition that developed during hospitalization was reported by various researchers at a rate of 10% to 50% (12, 13). Malnutrition increases postoperative complications and mortality rates, lengthens hospital stay, and increases total cost (8, 9, 14). Therefore, the nutritional status of all patients scheduled for major surgery should be evaluated, and NS should be administered to the patients when required (1, 6).

Many methods to evaluate nutritional status have been described. Although the gold standard has not yet been established, subjective global assessment (SGA) and NRS-2002 are the most frequently used. The European Society for Clinical Nutrition and Metabolism (ESPEN) recommends using SGA and NRS-2002 to assess nutritional status in daily practical use (15).

Since 2006, we have been recording the data of all our inpatients in our database in our clinic. Thus, we have the opportunity to access all the details of any time period with the keywords and filters we have chosen to audit or use them for a research. The nutritional status of all patients who are planned to be hospitalized in our clinic is evaluated in accordance with the NRS-2002 form. A nutritional plan is made for patients with an NRS score of more than 3. Of the patients for whom surgery is planned for intraabdominal malignancies, those with an NRS score of less than 3 are included in the perioperative pharmaconutrition protocol. For those with a high NRS score, preoperative NS is usually applied for 7–10 days using standard ONS, and then they are operated. The prealbumin and C-reactive protein (CRP) values of patients who underwent NS are checked and recorded once a week in the morning of surgery and postoperatively before beginning to give support. Enteral nutrition is started in the early postoperative period, and ONS is continued after starting the oral food intake to ensure the missing energy and protein requirement. When the patients are discharged, their prescriptions are prepared by recommending them to use oral supplements for 4–6 weeks.

Because healthcare professionals want to support or prove their diagnosis with laboratory data, many tests have also been investigated for the diagnosis of malnutrition, but a gold standard has not been established in this area. Studies on prealbumin (transthyretin) levels have been promising. It has been used as a biomarker to evaluate the risk of malnutrition, to diagnose malnutrition, to determine its severity, and to determine the effectiveness of NS, because it has a very short half-life and is not affected by anything other than inflammation (16, 17). We also use and evaluate prealbumin levels and CRP levels as inflammatory marker together in the assessment of nutritional status and in following NS.

The literature from previous years indicates that many studies were conducted on the use of ONS in the preoperative period in patients scheduled for gastrointestinal surgery with malnutrition. In detailed meta-analyses of these studies, the use of perioperative ONS has been reported to positively affect postoperative complications, mortality, LOS, and costs (18-20). However, there are different views on the timing of NS, and the debate continues between those who advocate that only preoperative usage is sufficient and those who suggest that it should be provided only postoperatively or during the entire perioperative period.

There is a strong evidence that perioperative pharmaconutrition, regardless of the patient's nutritional status, reduces LOS and postoperative complications (21, 22). In current guidelines, the implementation of pharmaconutrition for 5–7 days preoperatively and for 1 week postoperatively is strongly recommended for patients who will undergo major cancer surgery (1, 6). A meta-analysis indicated that, although the benefits of perioperative pharmaconutrition are supported, it does not have an advantage over standard products only when performed preoperatively (23).

Although there are many studies and meta-analyses on the effect of the use of perioperative ONS on postoperative results, studies examining its effect on readmission are very few and heterogeneous. The effect of ONS on readmission has been studied and found positive generally for elderly patients and nonsurgical disease groups (24, 25).

In this study, the effect of timing of NS, which was given to patients who underwent resective surgery for intraabdominal malignancies, on readmission was investigated. There was no difference between the 2 groups in terms of the operations performed, postoperative complications, and LOS. There was a significant difference in terms of the number of patients who needed readmission caused by any problem. Readmission rates in patients who received perioperative NS were significantly lower than in those who received preoperative NS only. In addition, when weight loss and prealbumin values of the patients who received preoperative NS only were examined, it was found that these patients had poorer nutritional status than the patients with malnutrition who received perioperative NS. It was accepted as an important finding that 9 of 11 patients who needed readmission in group B discontinued the use of oral supplements after discharge. Many studies argued that the catabolic process continues for a long time after major cancer surgery, and therefore, an additional ONS prescription should be prepared for 4–6 weeks after discharge, even if the patient can receive normal oral food (26, 27). Because this proposal is supported in the ESPEN guidelines, we have decided to continue our previous practice (1).

The results of this study indicated that NS, which was started in the preoperative period and continued postoperatively, has more positive effects on readmission rates and postoperative nutritional status.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Atatürk Training and Research Hospital (approval no. 2018/17).

Informed Consent: Due to the retrospective design of the study, informed consent was not taken.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – R.H.G.; Design – R.H.G.; Supervision – R.H.G.; Materials – B.O.B.; Data Collection and/or Processing – Ö.Y., B.O.B.; Analysis and/or Interpretation – S.A.; Literature Search – S.A., Ö.Y.; Writing Manuscript – R.H.G.

Conflict of Interest: The authors have no conflicts of interest to declare.

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