

The effects of enteral and parenteral nutrition on clinical outcomes in cancer inpatients receiving palliative care

Burcu Almacan¹, Sanem Gökçen Merve Kılınc¹, Ferhat Ekinci², Ahmet Dirican²,
Gamze Göksel Öztürk², Atike Pınar Erdoğan²

¹Department of Internal Medicine, Medicine Faculty of Celal Bayar University, Manisa, Turkey

²Department of Internal Medicine, Division of Oncology, Medicine Faculty of Celal Bayar University, Manisa, Turkey

ABSTRACT

Objectives: This study aims to determine the effects of enteral (EN) and parenteral nutrition (PN) on clinical outcomes in cancer inpatients receiving palliative care in the oncology unit.

Patients and methods: A total of 100 cancer patients who were admitted to the Manisa Celal Bayar University Oncology Inpatient Unit between January 2016 and December 2017 for palliative support were included in our study.

Results: There was no difference between EN and PN in terms of general mortality. According to patient characteristics, the rates of receiving chemotherapy and radiotherapy were equivalent. Parenteral nutrition may cause increased rate of central line infection due to growth in blood and urine culture. It may also disrupt fluid electrolyte balance.

Conclusion: Patients should be closely monitored for complications that may arise during parenteral and enteral nutritional therapy.

Keywords: Enteral nutrition, palliative care, parenteral nutrition.

Sufficient nutrition and positive caloric balance are among the most important factors determining quality of life and life expectancy in cancer patients.^[1] About 20-40% of cancer patients die due to severe malnutrition during the course of their disease. Negative nitrogen balance in cancer patients should be corrected and replaced by providing adequate calorie, protein, vitamin and mineral support.^[2] In cancer patients whose nutritional deficiencies cannot be corrected, enteral or parenteral nutritional supplement products can be used.^[3] Therefore, we planned this study to determine the effects of enteral (EN) and parenteral nutrition (PN) on clinical outcomes in cancer inpatients receiving palliative care in the oncology unit.

PATIENTS AND METHODS

This study included 100 cancer patients who were admitted to the Manisa Celal Bayar University Oncology Inpatient Unit between January 2016 and December 2017 for palliative support. Age, sex, nicotine use, additional diseases, blood tests at admission, and history of chemotherapy and radiotherapy of the patients were noted. Enteral or parenteral method of feeding, length of hospital stay, presence of growth in cultures, and history of embolization were investigated and noted. All statistical data were analyzed with SPSS version 15.0 software (SPSS Inc., Chicago, IL, USA). P<0.05 was considered level of statistical significance. Student's t-test was used

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Correspondence: Burcu Almacan, MD. Celal Bayar Üniversitesi Tıp Fakültesi İç Hastalıkları Anabilim Dalı, 45030 Manisa, Türkiye.
Tel: +90 554 - 553 07 78 e-mail: Burcu_almazcon@hotmail.com

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to assess continuous variables, while chi-square was used for categorical variables.

RESULTS

According to the demographic data of the 100 patients included in the study, the number of patients receiving PN was significantly higher among male patients compared to female patients (Table 1). Mean patient age was 57.28 (36-82) years in patients receiving EN, and 60.78 (30-82) among patients receiving PN. There was no significant difference between EN and PN groups according to general mortality. When patient characteristics were evaluated, the chemotherapy and radiotherapy rates were equivalent. There was no difference between the groups according to additional diseases (Table 1). It was 27% in the PN group and 8.3% in the EN group. The number of patients requiring intensive care was significantly higher in the PN group compared to the EN group ($p=0.036$). Thrombosis rates were similar among both groups. Central catheter infection complication in PN group compared to EN group; it was statistically significantly higher ($p=0.002$). Blood culture infection complication in PN group compared to EN group; it was statistically significantly higher ($p=0.002$). Urine culture infection complication in PN group compared to EN group; it was statistically significantly higher ($p=0.001$). There was no significant difference

between the groups according to length of hospital stay. Laboratory results at admission and 48 hours after hospitalization were compared using Wilcoxon Signed Ranks test. Creatinine and Na values were significantly higher 48 hours after hospitalization compared to admission values. Albumin levels were significantly lower at 48 hours compared to admission ($p=0.08$) (Table 2).

DISCUSSION

In this study, we investigated the general effects of nutritional support on clinical outcomes in cancer patients. Cachexia is a multifactorial syndrome characterized by severe body weight, muscle and fat loss, due to increased protein catabolism caused by the underlying disease. Cachexia is a serious condition as it causes increased morbidity and mortality.^[3] Adequate metabolic and nutritional support should be provided to prevent cachexia in cancer patients. In cancer patients whose malnutrition cannot be corrected, enteral or parenteral nutrition supplement products can be used. Nutritional support should be initiated in suitable patients by evaluating the potential risks and complications. We did not encounter a difference between enteral and parenteral nutrition in terms of mortality in cancer inpatients receiving palliative care in the oncology unit. In a meta-analysis by Elke et al.,^[4] no significant difference was observed between the

Table 1. Age, sex, comorbidity, history of chemotherapy or radiotherapy, length of stay, mortality, and thrombosis history of the patients

	Parenteral nutrition			Enteral nutrition		
	n	%	Mean±SD	n	%	Mean±SD
Age (year)			59.0±10.7			60.0±12.7
Sex						
Female	21	33.3		20	55.6	
Male	42	66.7		16	44.4	
Chemotherapy	53	62.4		32	37.6	
Radiotherapy	18	29		11	30.6	
Mortality	13	21		3	8.3	
Thrombosis	3	4.8		1	2.8	
Diabetes mellitus	13	20.6		9	25.0	
Hypertension	16	25.4		7	19.4	
Chronic kidney disease	9	14.3		8	22.2	
Coronary artery disease	7	11.1		5	13.9	
Length of hospital stay			7.0±7.6			7.0±13.3

SD: Standard deviation.

Table 2. Laboratory values at admission and 48 hours after admission

	Admission laboratory results	48-hour laboratory results	<i>p</i>
	Mean±SD	Mean±SD	
Neutrophil	5011.18±2880.764	5425.73±3150.413	0.846
Lymphocyte	1423.38±1018.877	1520.27±987.353	0.477
C-reactive protein	6.90±9.930	8.52±10.193	0.789
Albumin	3.3267±0.73560	3.09±0.762	0.08
Alanine aminotransferase	24.85±23.904	22.03±20.002	0.361
Creatinine	0.887±0.4024	1.08±0.490	0.049
Sodium	136.33±3.789	137.61±2.825	0.018
Potassium	4.15±0.651	4.03±0.706	0.668
International normalized ratio	1.06±0.236	1.04±0.200	0.317

two nutrition groups according to mortality.^[5-7] Enteral nutrition contributes to the maintenance of biological, immunological and chemical barrier balance of intestinal mucosa cells. Jilaling Shi et al.^[6] reported that hospital-acquired respiratory tract infections significantly decreased in patients receiving enteral nutrition due to the activation of lymphoid tissue found in the gastrointestinal system.^[8] In our study, according to infectious complications were significantly higher in terms of central line, blood culture, and urine culture growth among patients receiving PN compared to those receiving EN. Elke et al.,^[4] found an increase in infectious parameters.^[7] In a meta-analysis of 37 studies involving patients receiving long-term parenteral nutrition, the most common complication was catheter infection and catheter sepsis.^[7] However, there are studies showing that the incidence of infectious complications in critical patients may be reduced by contemporary care in intensive care units.^[8-10] Enteral nutrition is associated with a potentially low nutritional capability in end-stage terminal cancer patients with impaired oral intake and gastrointestinal dysfunction. Studies show that enterally fed patients receive less than 60% of the average prescribed calories.^[11] Parenteral nutrition is the primary therapeutic nutritional support to prevent metabolic degradation and loss of body mass in these critical patients.^[4] Studies have shown that patients receiving EN were fed with a lower calorie and nutritional content compared to PN.^[8] Shi et al.^[6] reported that PN provided rapid clinical improvement in critical patients, reducing the length of hospital stay. In our study, we did not observe a significant difference

between the two groups according to length of hospital stay. Albumin was used to evaluate the patient's nutritional status. However, there was no significant difference between admission and post-admission albumin values in either group. In our study, the need for intensive care was significantly higher in the PN group compared to the EN group. Fluid and electrolyte balance may be disrupted during parenteral feeding.^[7] We regularly monitored our patients for fluid, electrolyte imbalance, high blood sugar levels, and cardiovascular dysfunction that may occur during parenteral nutrition. We also found that the creatinine and Na values of the patients were significantly higher at post-admission compared to admission values. Hypophosphatemia, hypokalemia, hypomagnesemia and arrhythmia were not observed. We did not observe a difference in terms of blood sugar. Refeeding syndrome, characterized by biochemical and metabolic abnormalities following nutrition, was not observed in any of our patients. There was no significant difference in admission and post-admission liver enzymes and bilirubin levels in either group.

In conclusion parenteral nutrition may lead to increased blood culture and urine culture growth and central line infections and may disrupt fluid electrolyte balance. Patients should be closely monitored for complications that may arise during treatment.

Declaration of conflicting interests

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