



Case Report

Coronavirus (COVID -19), Advanced Age, and Malnutrition: A Risky Coexistence

*Ilke Kupeli¹, Fatma Yüksel²

¹Department of Anesthesiology and Reanimation, Derince Training And Research Hospital, Kocaeli, Turkey

²Nutrition Department, Erzincan Binali Yıldırım University, Erzincan, Turkey

***Correspondence**

Dr. Ilke Kupeli
 Department of
 Anesthesiology and
 Reanimation, Derince
 Training And Research
 Hospital, Kocaeli, Turkey
 E-mail:
 ilkeser2004@gmail.com

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ABSTRACT

Malnutrition is a more common nutritional disorder in older patients that causes negative reactions to normal human functions and is associated with high risk of infection, prolonged mechanical ventilation, and increased cost. Clinical observations have revealed that many older patients with COVID-19 are at risk of malnutrition or suffer from malnutrition. The aim of this case series was to evaluate 20 older patients with coronavirus, who suffered from malnutrition, and to examine the parameters likely contributing to malnutrition. This series included a total of 20 patients over 65 years of age, who were hospitalized for COVID 19 and had malnutrition according to the Nutritional Risk Screening 2002 (NRS-2002) form applied during admission. The mean age of the patients was 75.5±8.7 (years) and the female/male ratio was 7/13. While only 6 patients had no comorbid disease, the others had coronary artery disease, diabetes mellitus, hypertension, cerebrovascular disease, Alzheimer's disease, and heart failure. Three patients were at risk of malnutrition (NRS <5); on the other hand, 17 patients were suffering from malnutrition (NRS ≥5). Advanced age, comorbidity, hypoalbuminemia, low lymphocyte count, and low hemoglobin and protein values were considered as risk factors for malnutrition in this case series performed in COVID 19 patients. The relationship of these findings with mortality could not be determined.

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1. INTRODUCTION

A new coronavirus (SARS-CoV-2) has spread rapidly in China and many other countries, thus resulting in COVID-19 outbreak. Supportive therapy is the main treatment modality due to lack of an effective drug therapy in clinical practice.^{1,2} In a study conducted in Wuhan, the overall prognosis was found to be worse in older patients than young and middle-aged patients.³ This may be associated with poor nutritional status of older patients. Clinical observations have revealed that many older patients with COVID-19 are at risk of malnutrition or suffer from malnutrition.

Malnutrition is a nutritional disorder that causes negative outcomes in normal human functions

and is more commonly seen in older patients.⁴ In a study involving 504 adult patients admitted to a new hospital, 159 (31.5%) patients were found to have a risk of malnutrition according to Nutritional Risk Screening. 2002 (NRS-2002).⁵ Age-related physiological changes, restrictions in physical and mental function, and health and social aspects are addressed as individual factors related to the etiology of malnutrition in the older people.⁶ As the malnutrition has a multifactorial etiology, older people are often more affected by various risk factors. Therefore, malnutrition experienced by older patients are associated with higher rates of infection complications, prolonged mechanical ventilation and intensive care hospitalization, and higher risk of mortality.⁷

The aim of this case series is to remind the factors affecting malnutrition and its relevance to mortality in advanced age COVID-19 patients with malnutrition during hospitalization.

2. CASE SERIES

Written informed consent was obtained from all patients/patient relatives.

This series included a total of 20 patients over 65 years of age, who were hospitalized for COVID 19 and suffered from malnutrition according to the NRS-2002 form applied during admission. Patients hospitalized in the COVID 19 anesthesia intensive care unit between April 1 and April 30 were included in this study. Patients' data and NRS 2002 values were taken from the records within the first 24 hours of their admission. The follow-up period of the patients was limited to a maximum of 30 days.

The mean age of the patients was 75.5±8.7 (years) and the female/male ratio was 7/13. While only 6 patients had no comorbid disease, the others had coronary artery disease [1 patient (5%)], diabetes mellitus [4 patients (20%)], hypertension [3 patients (15%)], cerebrovascular disease [7 patients (35%)], Alzheimer's disease [1 patient (5%)], and heart failure

[6 patients (30%)], and 8 patients had more than one comorbidity. The nutritional risk was screened by NRS 2002 score within 24h after admission, including the three major assessment parts: 1) the severity score of the effect of the primary disease on the nutritional status (0–3 points); 2) the nutritional status score (0–3 points): changes in weight in the last 3 months, changes in dietary intake in a week and the body mass index; and 3) age score: age >70, plus 1 point; and the total score is the sum of three. Thus, the final score can range from 0 to 7. During this study, 8 patients died, 8 patients were discharged, and 4 patients were still under treatment. Table 1 shows the demographic data of the patients as well as albumin, lymphocyte, hemoglobin, total protein, NRS 2002 scores, body mass indexes, nutritional strategies, and mortality and morbidity conditions. The mean age of the patients was 75.5±8.7. All patients had low albumin, hemoglobin, and protein values at the first visit. While three patients were at risk of malnutrition (NRS <5), 17 patients were suffering malnutrition (NRS ≥5). 40% of the patients needed enteral + parenteral nutrition. Table 2 shows the conditions related to mortality. High protein nutrition recommended by ESPEN was applied as nutritional strategies.⁸

The results were presented for categorical variables as numbers and percentages and for continuous variables as mean±standard deviation or median. The categorical variables between the groups was compared using Chi-square or Fisher exact test. The statistical level of significance for all tests was accepted as 0.05. Statistical analysis was performed using the IBM SPSS ver. 19 software (IBM Software, New York, United States).

Table 1. Demographic data, initial admission values, nutritional strategies, and mortality/morbidity conditions of the patients.

n: 20		n/(%)	normal value
Age (year)*		75.5±8.7	
Sex	Female	7 (35%)	
	Male	13 (65%)	
Lymphocyte (X10³/UI)*		1.2±0.7	(1-5)
NRS-2002*		5.9±1.1	
Albumin (g/L)*		29.7±5.3	(35-52)
Hemoglobin(g/dL)*		11.9±2.4	(12-16)
Protein(g/L)*		59.0±7.8	(66-83)
Body Mass Index (kg/m²)*		23.6±5.6	
Comorbidity	Coronary Artery Disease	1 (5%)	
	Diabetes Mellitus	4 (20%)	
	Hypertension	3 (15%)	
	Cerebrovascular Disease	7 (35%)	
	Alzheimer's Disease	1 (5%)	
	Heart Failure	6 (30%)	
Mortality	Death	8	
	Discharge	8	
	Ongoing	4	
Feeding method	Parenteral	2	
	Enteral	5	
	Oral	5	
	Combined	8	

*Age, Lymphocyte, NRS-2002, Albumin, Hemoglobin, Protein, and Body Mass Index are given as Mean±SD.

3. DISCUSSION

Malnutrition is defined as poor nutrient intake or absorption, leading to a reduction in fat and muscle mass. The prevalence of malnutrition in the older patients ranges from 1% to 24.6%.⁹ Malnutrition has multiple risk factors in the older patients. The older patients are at higher risk due to high prevalence of comorbidity, aging-related changes in body composition and gradual loss of skeletal muscle mass and function (sarcopenia) as well as additional factors including mouth / tooth and chewing problems, psycho-social problems, cognitive impairment,

and low financial income. According to a study conducted in Wuhan during COVID 19, patients with comorbidity, especially diabetes, were more prone to malnutrition.³ In the present study, comorbidity (such as diabetes mellitus, cerebrovascular disease, and heart failure) was frequently encountered in patients with malnutrition at the time of admission.

It is known that albumin level is affected by nutritional status¹⁰ and low albumin level is associated with increased rates of morbidity and mortality in many patient populations.¹¹ In their study, Li et al.³ observed that 27.5% of patients over the age of 65 diagnosed with COVID 19 were at risk of malnutrition and 52.7% were malnourished. In the same study, they stated that neo coronavirus infection induces acute inflammatory response and causes albumin and even muscle protein consumption, therefore hypoalbuminemia is common in these patients. In the present series, albumin levels were found to be low in all patients, but their association with mortality was not detected. This decrease in albumin has been attributed to acute illness.

Similarly, the total lymphocyte count has a long history as part of its nutritional assessment based on its strong prognostic value. As a part of immunological dysfunction that occurs with malnutrition, the lymphocyte count decreases. However, there is no evidence to support the use of sequential lymphocyte counts in monitoring a patient's response to nutritional support.¹² In the present study, lymphocyte count was not associated with mortality. Lymphocytopenia was observed in one discharged patient and five deceased patients. However, much more works are needed to generalize this situation.

In the literature, there are studies indicating that low hemoglobin values can be seen in malnutrition and if anemia is corrected,¹³ malnutrition may also regress.¹⁴ In the present study, although protein levels were low in all patients, hemoglobin levels were normal. However, the correlation of low protein at the time of admission with mortality was not found.

The current Society of Critical Care Medicine (SCCM) and ASPEN guidelines recommend the use of the NRS or The Nutrition Risk in Critically ill (NUTRIC) score to assess the nutritional risk in critically ill patients for the provision and evaluation of nutritional support therapy in adults with critical illness. Risk of malnutrition is high according to NRS criteria, if age-corrected total score is 5. However, while nutritional screening tools are developed to identify malnourished patients, none has been demonstrated to provide clinically significant prognostic value in critical care setting or its association with mortality.⁷ In accordance with the protocol of Republic of Turkey Ministry of Health, we also use the NRS 2002 form for nutritional screening in our hospital. In parallel with the literature, no correlation was found between NRS 2002 and mortality in our cases.

The present study has some limitations. Since it is a case series, the results of the present study cannot be generalized to the society. Intubation or mechanical ventilation was not evaluated, but all patients (whether intubated or not) were started according to the ESPEN guidelines. Many factors are known to affect mortality (APACHE II score, vasoactive drug requirement, ventilation parameters ...). Therefore, studies with larger sample are needed to support the correlation of the current results with mortality. In this case series, patients admitted to only one intensive care were included and patients staying in the other intensive care units in our hospital were not included in the study.

Table 2. The conditions related to mortality.

	Mortality		p
	Death	Survival group	
Age (median-min/max)	76.5-65/88	73-65/88	0.303
Sex (F/M) (%)	15/25	20/40	0.681
Lymphocyte(X103/UI) (<1) (%)	25	25	0.361
(>1) (%)	15	35	
NRS-2002 (≥5) (%)	40	45	0.125
Albumin(g/L) (<35) (%)	35	50	0.798
Protein(g/L) (<66) (%)	35	45	0.494
Body Mass Index (kg/m ²) (%) (<18,5)	5	15	0.706
18.5–24.9	15	20	
25–29.9	10	20	
>30	10	5	
Feeding method (%) (Oral)	5	10	0.376
Enteral	10	0	
Parenteral	0	5	
Combined	25	5	

*Chi-Square Tests. Discharge and ongoing groups as survival group.

In this case series, low albumin, protein, and lymphocyte counts and high NRS 2002 scores were found in all COVID 19 malnourished patients with mortality, but the correlation of these results with mortality could not be determined.

4. CONCLUSION

Advanced age, comorbidity (such as diabetes mellitus, cerebrovascular disease, heart failure), hypoalbuminemia, low lymphocyte count, and low hemoglobin and protein values were also considered as risk

factors for malnutrition in this case series conducted in COVID 19 patients. Although these results are observed in all deceased patients, further studies are required for its correlation with mortality. In order to improve both short- and long-term prognosis, the diagnosis of malnutrition should be taken into account for the treatment of COVID-19 patients, and nutritional support should be strengthened especially in concomitant diseases such as diabetes mellitus and in patients with low albumin/lymphocyte/protein.

CONFLICTS OF INTEREST

The authors declared no conflicts of interest including financial, consultant, institutional and other relationships that might lead to bias.

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