Relationship between blood albumin level and clinical condition of patients with Covid-19 admitted to Shahid Sadoughi hospital in Yazd

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ABSTRACT

COVID-19 infection is still widespread around the world. It has been demonstrated that albumin is a biomarker in COVID-19 diagnosis. The aim of this study was to investigate the relationship between blood albumin and clinical status of COVID-19 patients. In our study, patients older than 18 years admitted to a hospital in Yazd with a positive PCR test participated. Related data was analyzed by SPSS software. 34.2 % of the men with lower than normal albumin levels needed to be admitted to the ICU. Also, 32.8 % of the women with lower than normal albumin levels needed to be admitted to the ICU. The results of the present study showed that the patients with lower serum albumin needed to be admitted to the ICU more than other patients.

***Keywords*:** COVID-19, serum albumin, clinical status

INTRODUCTION

The severe acute respiratory syndrome coronavirus (SARS-CoV)-2 is the Coronavirus Disease 2019 (COVID-19) agent. Coronaviruses (CoVs) have RNA as single chain with positive polarity [1-3].

As COVID-19 infection lasts to distribution everywhere the world and has an important influence on public health, recognizing prognostic issues is vital to guessing clinical consequences [4,5]. Albumin is one of the most important proteins in the human body and has anti-

inflammatory effects [6-8]. Some studies have shown that low serum albumin rates can predict mortality rate of COVID-19 infection [9-11].

We directed this study to investigate the relationship between blood albumin levels and clinical status of patients with COVID-19.

MATERIALS AND METHODS

This cross-sectional study was performed during January 2020 to September 2021. It was approved in the ethics committee of Shahid Sadoughi University of Medical Sciences of Yazd, Iran with the ethics code of IR.SSU.REC.1400.145. Oral consent was obtained from patients. All patients above 18 years with positive PCR test for COVID-19 were entered to the study.

Data was including the hospitalized patients' information in infectious diseases and ICU wards (Age, gender and albumin rate).

Age groups were divided to three groups including 18-40, 40-60 and above 60 years.

Exclusion criteria included patients with incomplete information.

After collecting the data were entered into SPSS (version 22) and Chi-Square test was also used to analyze the data. In all cases, $p < 0.05$ was considered as a significant level.

RESULTS

In the present study, 6663 patients (3512 males and 3151 females) were evaluated whose demographic characteristics are given in Table 1.

34.2 % of the men with lower than normal albumin levels were admitted to the ICU (Table 2).

Based on age, people over 60 years who had lower than normal serum albumin levels were more admitted patients to the ICU (Table 3).

Table 1. Demographic characteristics of patients

Variable		Frequency	Percentage
Gender	Male	3512	52.7
	Female	3151	47.3
	Total	6663	100
Ward	Infectious Diseases	5917	88.8
	ICU	746	11.2
	Total	6663	100
Outcome	Improvement	623	9.4
	Relative improvement	5178	77.7
	Death	862	12.9
	Total	6663	100

Table 2. Patients' blood albumin levels in two genders

Gender	Albumin level	Ward N (%)	ICU N (%)	Total N (%)	p-value
Male	Normal	2575 (92.4)	212 (7.6)	2878 (100)	
	Less than normal	368 (65.8)	191 (34.2)	559 (100)	
	More than normal	158 (97.5)	4 (2.5)	162 (100)	0.17
	Total	3101 (88.4)	407 (11.6)	3508 (100)	
Female	Normal	2371 (92.8)	184 (7.2)	2555 (100)	
	Less than normal	315 (67.2)	154 (32.8)	469 (100)	
	More than normal	124 (100)	0 (0)	124 (100)	
	Total	2810 (89.3)	338 (10.7)	3148 (100)	

DISCUSSION

In a study similar to the present study, most of the patients with COVID-19 were male, 26.1 % of whom were transferred to the ICU and the rest were in the ward [12], which compared to the present study (11.1 %), a higher percentage of patients needed to be admitted to the ICU.

In another study, 323 patients with COVID-19 were evaluated, most of the patients were male and 10.8 % of the patients died [13], which had a lower mortality compared to the present study.

In our research, there was a significant association between albumin rate and ward based on age. The results of the present study also showed that patients with lower serum albumin required more hospitalization in the ICU than other patients.

Table 3. Patients' blood albumin levels based on age groups

Age group (year)	Albumin level	Ward N (%)	ICU N (%)	Total N (%)	p-value
18-40	Normal	1226 (97.1)	37 (2.9)	1263 (100)	
	Less than normal	86 (77.5)	25 (22.5)	111 (100)	
	More than normal	142 (100)	0 (0)	142 (100)	
	Total	1454 (95.9)	62 (4.1)	1516 (100)	
40-60	Normal	1888 (94.4)	111 (5.6)	1999 (100)	< 0.001
	Less than normal	144 (67)	71 (33)	215 (100)	
	More than normal	103 (97.2)	3 (2.8)	106 (100)	
	Total	2135 (92)	185 (8)	2320 (100)	
>60	Normal	1832 (88.1)	248 (11.9)	2080 (100)	
	Less than normal	453 (64.5)	249 (35.5)	702 (100)	
	More than normal	37 (97.4)	1 (2.6)	38 (100)	
	Total	2322 (82.3)	498 (17.7)	2820 (100)	

In one study, low serum albumin level of hospitalized patients was associated with an increase in mortality, and this factor is a predictor even after controlling many factors such as age and underlying diseases [14] which in this respect is consistent with current study.

Another study also showed that hypoalbuminemia is common in COVID-19 patients and its level is associated with disease severity. Patients with symptoms of fever, fatigue, and headache or dizziness at the beginning of admission were more likely to have hypoalbuminemia [15].

In one study, a statistically significant relationship was found between primary hypoalbuminemia and mortality [4], which was similar to the present study.

CONCLUSION

The present study proved that lower albumin level was related to hospitalization in the ICU. Therefore, testing of serum albumin is necessary and should be performed during the treatment of COVID-19 patients as a tool to assess the prognosis of infection.

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