

Retrospective evaluation of critical geriatric and adult COVID-19 patients

Kritik geriyatrik ve yetişkin COVID-19 hastalarının retrospektif olarak değerlendirilmesi

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ABSTRACT

Background: 5% of cases in COVID 19 disease require hospitalization in an intensive care unit. COVID -19 has a high mortality rate in the intensive care unit (ICU). There are many factors that affect this. There is no study on whether aging is one of these factors for intensive care patients.

Objective: With this study, the data of critical geriatric and adult COVID-19 patients we followed up in the covid intensive care unit were evaluated and it was aimed to recognize the characteristics of critically ill patients.

Material and Method: The files of 70 geriatric and 67 adult patients followed in the COVID-19 ICU were scanned and evaluated.

Results: When evaluated in terms of developing organ dysfunction, cardiac arrhythmia was found to be statistically significant in adult patients ($P=.01$). 53 (75%) of 70 geriatric patients and 45 (67.1%) of 67 adult patients required invasive mechanical ventilation support. Intensive care mortality was 74.2% (52) in geriatric patients and 67.1% (45) in adult patients. There was no significant difference between the two groups in terms of mortality.

Conclusion: It turned out that old age and being an adult are not important in terms of mortality in COVID-19 patients who need to be followed up in the intensive care unit.

Keywords: COVID-19 intensive care unit, geriatrics and COVID-19, mortality, COVID-19, COVID-19 mortality

ÖZ

Arka Plan: COVID 19 hastalığındaki vakaların %5'i yoğun bakım ünitesinde yatış gerektiriyor. COVID -19 hastalığı yoğun bakım ünitesinde (YBÜ) yüksek bir ölüm oranına sahiptir. Bunu etkileyen birçok faktör var. Yoğun bakım hastaları için yaşlanmanın bu faktörlerden biri olup olmadığına dair bir çalışma bulunmamaktadır.

Amaç: Bu çalışma ile covid yoğun bakım ünitesinde takip ettiğimiz kritik geriyatrik ve yetişkin COVID-19 hastalarının verileri değerlendirilmiş ve kritik hastaların özelliklerinin tanınması amaçlanmıştır.

Gereç ve Yöntem: COVID-19 yoğun bakım ünitesinde takip edilen 70 geriyatrik ve 67 yetişkin hastanın dosyaları taranarak değerlendirildi.

Bulgular: Gruplar gelişen organ disfonksiyonu açısından değerlendirildiğinde, yetişkin hastalarda kardiyak aritmi istatistiksel olarak anlamlı bulundu ($P=.01$). 70 geriyatrik hastanın 53'ü (%75) ve 67 yetişkin hastanın 45'i (%67,1) invaziv mekanik ventilasyon desteği gerektirdi. Yoğun bakım mortalitesi geriyatrik hastalarda %74,2 (52), yetişkin hastalarda ise %67,1 (45) idi. Mortalite açısından iki grup arasında anlamlı fark yoktu.

Sonuç: Yoğun bakımda takip edilmesi gereken COVID-19 hastalarında yaşlılık ve yetişkin olmanın mortalite açısından önemli olmadığı ortaya çıktı.

Anahtar Kelimeler: COVID-19 yoğun bakım ünitesi, geriyatri ve COVID-19, ölüm, COVID19, COVID-19 mortalitesi

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INTRODUCTION

Severe atypical pneumonia cases were reported in Wuhan, China in December 2019 (1). These atypical cases of severe pneumonia caused by the SARS-CoV-2 virus were defined as COVID-19 disease by the world health organization. The rapid increase in the number of cases and deaths all over the world in a short time has made this disease one of the most critical global emergency health conditions of modern times (2). Cases have been reported in our country since March 2020.

COVID-19 disease has a wide clinical spectrum from asymptomatic cases to acute respiratory failure requiring intensive care follow-up and is a disease that can cause death. Respiratory failure, septic shock, and multi-organ failure may develop due to acute respiratory distress syndrome (ARDS), usually 7-12 days after the onset of symptoms (3). Studies have reported that COVID-19 disease is mild in 81%, severe in 14% and intensive care need develops due to organ failure in 5% (4). Life support treatments such as noninvasive mechanical ventilation, invasive mechanical ventilation methods, vasopressor support and dialysis are applied in the intensive care unit (5).

COVID-19 disease can cause high mortality and morbidity depending on factors such as male gender, chronic diseases and advanced age (5). Although mortality rates vary by country, the mortality rate in the society is 5.2%, while this rate in intensive care patients varies between 30% and 100% (6,7). Therefore, successful treatment of COVID-19 patients in intensive care is of great importance in reducing mortality. With this study, the data of critical geriatric and adult COVID-19 patients we followed up in the covid intensive care unit were evaluated and it was aimed to recognize the characteristics of critically ill patients.

MATERIAL AND METHOD

In this study, 70 patients in the geriatric age group (65 and over) and 67 patients in the adult patient group (18-64 years old) who were hospitalized in the COVID-19 intensive care unit with the diagnosis of COVID-19 between October - December 2020 were evaluated retrospectively. The study was conducted in accordance with the Declaration of Helsinki. Ethics committee approval was obtained from the University Faculty of Medicine Clinical Research Ethics Committee (Date: 11.02.2021, Decision number: 2020-KAEK-143-40).

Real time polymerase chain reaction (rt-PCR) test of all patients included in the study was positive. All patients had severe pneumonia Republic of Turkey according to the COVID-19 diagnosis and treatment guidelines of the Ministry of Health (8). Patients; gender, age, comorbidity [diabetes mellitus (DM), hypertension (HT), heart failure (HF), cerebrovascular diseases (CVD), chronic renal Failure (CRF), cancer], invasive mechanical ventilator support, intensive care hospitalization periods, Intensive care mortality, organ failure during the intensive care follow-up period (impairment in liver function tests, impairment in kidney function tests, new neurological event, impairment in cardiac functions) were recorded and evaluated.

Statistical analyzes were performed using SPSS 26.0 software program (SPSS Inc., Chicago, IL, USA). After Kolmogorov - Simirnov test was applied to all data, Independent Samples

T-Test was used for normally distributed data and Mann Whitney U test was used for skewed data. Binary logistic regression analysis was performed to examine the cause-effect relationship between the dependent variable and the independent variables. Chi-square test was used to compare nominal values between groups. $p < 0.05$ was considered significant.

RESULTS

A total of 137 patients, 70 from the geriatric patient group and 67 from the adult patient group, were included in the study. Forty-four (62.8%) of the geriatric patients were male and 26 (37.2%) were female. The age range is 65-95, the average age is 76.4. There were 16 (22.8%) patients without comorbidity, 29 (41.4%) patients with one, and 25 (35.7%) patients with two or more comorbidities in the geriatric patient group. There were 55 (82.1%) male and 12 (17.9%) female patients in the adult patient group. The age range of the adult patient group was between 22-64 and the mean age was 43.9. In the adult patient group, 31 (46.2%) patients had no comorbidity, 22 (32.8%) patients had a single disease and 14 (20.8%) patients had two or more comorbidities. The most common accompanying diseases in geriatric patients; respiratory system diseases (27.1%, $n=19$), hypertension (25.7%, $n=18$) and diabetes mellitus (24.2%, $n=17$). Comorbidities in adult patients were respiratory system diseases (29.8%, $n=20$), diabetes mellitus (19.4% $n=13$), and hypertension (11.9%, $n=8$).

Demographic data can be seen from **Table 1**.

When the patients are evaluated; The duration of treatment in intensive care was between 1 and 60 days in geriatric patients and 1 to 22 days in adult patients. Mean intensive care treatment was 12.5 days in the geriatric patient group and 10.95 days in the adult patient group. 53 (75%) of 70 geriatric patients and 45 (67.1%) of 67 adult patients needed invasive mechanical ventilation support. There was no statistically significant difference between the two groups in terms of length of stay in the ICU and invasive mechanical ventilation support ($p > .05$). Significant impairment was observed in kidney functions in both groups in the evaluation of organ failure during the treatment process in the intensive care unit. Renal dysfunction was present in 23 (32.8%) of geriatric patients, liver dysfunction in 7 (10%), cerebrovascular event in 4 (5.7%), and heart rhythm disorder in 7 (10%). In adult patients, 17 (25.3%) had renal dysfunction, 6 (8.9%) had liver dysfunction, 2 (2.9%) had cerebrovascular events, and 17 (25.3%) had cardiac arrhythmia. Cardiac arrhythmia was statistically significantly higher in the adult patient group ($p=.01$).

Intensive care mortality was 74.2% (52 patients) in geriatric patients and 67.1% (45 patients) in adult patients. No statistically significant difference was found between both groups (geriatric-adult) in critical COVID 19 disease followed in the intensive care unit ($p=.36$). The intensive care process of the patients can be seen in **Table 2**.

In the regression analysis conducted to examine the cause-effect relationship between the dependent variable and the independent variables, it was found that being older than 65 and younger than 65 had no effect on mortality, and the presence of respiratory system diseases increased mortality approximately 4 times ($p=.01$, **Table 3**).

	Geriatric n (%)	Adult n (%)
Male (n/%)	44 (62.8%)	55 (82.1%)
Female (n/%)	26 (37.2%)	12 (17.9%)
Age range (Years)	65-95	22-64
Average age (Years)	76.4	43.9
No additional disease (n /%)	16 (22.8%)	31 (46.2%)
A comorbidity (n /%)	29 (41.4%)	22 (32.8%)
≥2 additional diseases (n /%)	25 (35.7%)	14 (20.8%)
Additional diseases		
Diabetes mellitus	17 (24.2%)	13 (19.4%)
Hypertension	18 (25.7%)	8 (11.9%)
Renal failure	7 (10%)	2 (2.9%)
Cardiac diseases	12 (17.1%)	5 (7.4%)
Respiratory diseases	19 (27.1%)	20 (29.8%)

n=Number of patients

	Geriatric (n:70)	Adult (n:67)	p value
Intensive care stay (Days)	1-60	1-22	-
Average intensive care stay (Days)	12.5±11	10.9±5.8	>.05
Invasive need for MV (n /%)	53(75%)	45(67.1%)	>.05
Renal dysfunction (n /%)	23(32.8%)	17(25.3%)	>.05
Liver dysfunction (n /%)	7(10%)	6(8.9%)	>.05
Cerebrovascular event (n/%)	4(5.7%)	2(2.9%)	>.05
Cardiac arrhythmia (n /%)	7(10%)	17(25.3%)	= .01
Intensive care mortality (n /%)	52(74.2%)	45(67.1%)	>.05

MV=Mechanical ventilator, n=Number of patients

Variables	β	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender(1)	-.496	.478	1.080	1	.299	.609	.239	1.552
Intensive Care Stay (Days)	.004	.023	.032	1	.859	1.004	.961	1.050
Group (1)	-.166	.422	.154	1	.695	.847	.371	1.936
A Comorbidity (1)	-.537	.610	.777	1	.378	.584	.177	1.930
≥2 Additional Diseases (1)	-.651	.930	.489	1	.484	.522	.084	3.230
Diabetes Mellitus (1)	.231	.763	.092	1	.762	1.260	.282	5.626
Hypertension (1)	.021	.610	.001	1	.972	1.021	.309	3.374
Renal Failure (1)	.269	.953	.079	1	.778	1.308	.202	8.477
Cardiac Diseases (1)	.372	.962	.288	1	.591	1.450	.374	5.628
Respiratory Diseases (1)	1.348	.521	6.628	1	.010	3.850	1.386	10.695
Constant	.412	1.288	.102	1	.749	1.510		

Cox & Snell R2 =.073, Nagelkerke R2=.104, -2 Log Likelihood=155.061

DISCUSSION

In this study, the clinical processes and prognosis of critical geriatric and adult patients who admitted to the Kastamonu Training and Research Hospital COVID Intensive Care Unit and had a positive rt-PCR test were evaluated. Treatment recommendations recommended in the Ministry of Health COVID-19 diagnosis and treatment guidelines were applied to all patients (8).

In the study conducted by Haase et al. (9) the average age of intensive care patients was found to be 68. In the study conducted by Guan et al. (10) with 1099 patients, it was reported that the disease was more common in men with 52.1% and 23.7% of the patients had at least one chronic disease. Our study, the mean age of geriatric patients was 76.4 and 43.9 for adult patients. 62.8% of geriatric patients and 82.1% of adult patients were male. Most patients had at least one comorbidity. While 77.2% of geriatric patients and 53.8% of adult patients have a comorbidity; two or more comorbidities were found in 35.7% of geriatric patients and 20.8% of adult patients. The most common for both groups were hypertension, cardiovascular diseases, diabetes mellitus, and respiratory system diseases, similar to literature studies (11). In studies conducted, organ dysfunctions that develop during the treatment of COVID-19 patients have been reported as 10-30% for renal failure, 19% for liver dysfunction, 2% for cerebrovascular event and 44% for cardiac arrhythmia (12-15). When developing organ failure was evaluated, our study was found similar to the literature for the two groups in terms of renal failure and cerebrovascular disease. Our rates of cardiac arrhythmia and liver dysfunction were lower for both groups. While acute renal failure was the most common organ failure in

both groups, cardiac arrhythmias were higher in adult patients. In the study of Haase et al. (9); the mortality of intensive care patients was reported as 37%, the rate of invasive mechanical ventilation need as 82%, and the average length of stay in the intensive care unit as 13 days. In our study; Our rate of invasive mechanical ventilation requirement in geriatric patients was 78.5%, similar to existing studies. This rate was 67.1% in adult patients. The length of stay in the intensive care unit for both groups is similar to the literature, and this period is shorter in the adult patient group (10).

In a study conducted in China, mortality was reported to be 49% in 2087 intensive care patients with COVID-19 disease. In reports involving fewer patients, this rate was 62% and 67% (16,17). In the study in which Liu et al. (18) divided and evaluated 221 COVID 19 patients into 2 groups, 136 patients under the age of 60 and 85 patients over the age of 60; It has been reported that the disease is more severe, more mortal and has a longer course in the patient group over 60 years of age. In the study of Meng et al. (19) involving 168 patients, it was emphasized that mortality was higher in the patient group aged 80 years and over. In our study, the mortality rate in the geriatric patient group was similarly higher than in the adult patient group. However, there was no statistically significant difference in mortality between geriatric and adult patient groups. This is because we think that other studies in the literature generally do not only cover the adult patient group followed in the intensive care unit, but are related to the evaluation of in-hospital mortality. However, our study only covers intensive care patients. The patient group that needs intensive care treatment in COVID 19 disease; are mostly patients with comorbidities. As in our study, mortality can be seen at a similar rate in adult and geriatric patients who need intensive care treatment.

Studies have revealed that COVID-19 disease can affect all age groups and has a more fatal course in the geriatric population. However, as shown in this study, mortality may be high in the adult age group, especially in the adult age group accompanied by comorbidities that need treatment in the intensive care unit. There are a limited number of studies evaluating critical ICU COVID-19 patients as geriatric and adult patient groups. We think that the perception of “those who lost their lives due to COVID-19 are old” in the society can be prevented with comprehensive studies and information on this subject. Thus, we think that all members of the society can comply with the rules developed to prevent the spread of the disease and, as a result, the pace of the epidemic can be broken.

The limitations of the study include the availability of single-center data, cross-sectional and limited number of patients.

ETHICAL DECLARATIONS

Ethics Committee Approval: Ethics committee approval was obtained from the University Faculty of Medicine Clinical Research Ethics Committee (Date: 11.02.2021, Decision No: 2020-KAEK-143-40).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

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

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