Original Article

DOI: 10.4274/haseki.galenos.2022.8501
Med Bull Haseki 2022;60:439-446

Risk Factors and Predictors of 1-year Overall Mortality in Patients with COVID-19

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Abstract

Aim: To date, limited data exists on 1-year mortality and associated factors in patients with coronavirus diseases-2019 (COVID-19). We determined risk factors and predictors of 1-year mortality.

Methods: In this retrospective and single-center study, hospitalized patients with COVID-19 were enrolled between March 11 and March 11, 2020. The primary outcome was 1-year all-cause mortality after discharge from the hospital. Secondary outcomes were the risk factors and predictors of 1-year mortality. A comparative analysis was applied to patients who died after recovering from acute COVID-19 and patients who survived.

Results: A total of 567 patients were analyzed. The 1-year mortality occurred in 18 (3.2%) patients. Older age (p=0.001), chronic obstructive pulmonary disease (p=0.001), chronic artery disease (p=0.001), chronic renal failure (p=0.001), presence of pleural fluid (p=0.001), high levels of leukocyte (p=0.001), neutrophil (p=0.001), monocyte (p=0.026), C-reactive protein (p=0.042), procalcitonin (p=0.004), urea (p=0.001), creatinine (p=0.001), troponin (p=0.001), lactate dehydrogenase (p=0.019), potassium (p=0.003), and a low level of alanine aminotransferase (p=0.001) at the first admission were associated with increased long-term mortality. Additionally, the need for intensive care unit (ICU) admission (p=0.007) and invasive ventilation (p=0.019) during the hospital stay for COVID-19 were associated with increased 1-year mortality.

Conclusion: This study suggests that age, underlying diseases, pleural fluid, certain laboratory parameters, and ICU care are somewhat associated with 1-year mortality.

Keywords: COVID-19, 1-year mortality, risk factors, predictors

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Received: 25.05.2022 **Accepted:** 05.10.2022

Introduction

The coronavirus disease-2019 (COVID-19) has had a global impact, resulting in over 6 million deaths as of April 2022 (1). Hospitalized patients with COVID-19 frequently have pneumonia, which causes respiratory failure and results in multiorgan dysfunction, the need for invasive ventilation, and death (2,3). While most survivors have a full recovery after discharge from the hospital, some patients need long-term follow-up care due to the complications of COVID-19 and long-COVID symptoms (4,5).

To date, limited data exists on 1-year mortality in patients with COVID-19, although 30-day and 3-6-month outcomes of COVID-19 are well-known (6,7). Therefore, in this study, we aimed to determine the prevalence of 1-year mortality among survivors and to explore the risk factors and predictors of long-term mortality after discharge from the hospital.

Materials and Methods

Compliance with Ethical Standards

All procedures performed in this study were in accordance with the ethical standards of the Declaration of Helsinki. This study was approved by the Ethics Committee of University of Health Sciences Turkey, Istanbul Haseki Training and Research Hospital (approval number: 102-2022, date number: 08.06.2022) and the Advisory Board on Coronavirus Research of the Republic of Turkey Ministry of Health (approval number: 2022-01-26T10_14_12, date: 27.01.2022). Written informed consent was waived because of the retrospective nature of this study.

Study Design

In this single-center study, all hospitalized adult patients (older than 18 years old) with laboratory-confirmed COVID-19 between March 11 and March 11, 2020, were retrospectively enrolled. For laboratory confirmation, positive severe acute respiratory syndromecoronavirus-2 real-time reverse transcriptase polymerase chain reaction testing from oropharyngeal and/or nasopharyngeal swabs was used. We excluded patients with asymptomatic COVID-19 and patients who died during the hospital admission.

Patients' Evaluation

This study was designed as a continuation of our previous study (8). In the study, demographic and clinical features, laboratory test results, radiological findings, and short-term outcomes were obtained from medical charts and recorded via a follow-up data sheet. The primary outcome was 1-year all-cause mortality after discharge from the hospital. Secondary outcomes were the risk factors and predictors of 1-year mortality. For mortality, the National Death Report Database was used to obtain the 1-year mortality. The patients were divided into two groups: deceased and surviving patients. A comparative analysis was applied to patients who died after recovery from acute COVID-19 and patients who survived.

Statistical Analysis

Categorical parameters were represented as frequencies (n) and percentages (%), whereas quantitative parameters were represented as median and interquartile ranges (IQR). The chi-square test or Fisher's exact test were used to compare categorical data.The Kolmogorov-Smirnov test was used for normal distribution analysis. The Independent sample t-test was applied for normally distributed variables, while the Mann-Whitney U test was performed for variables without normal distribution. A p value less than 0.05 was considered significant. Odds ratios (OR) with 95% confidence intervals were determined. The analyses were performed using IBM SPSS-21 (Statistical Package for Social Sciences, IL, USA).

Results

A total of 567 patients were enrolled in the study. Of those, 298 (52.6%) were male, and the median (IQR) age was 53 (41-62) years. The 1-year mortality occurred in 18 (3.2%) patients. One-year mortality was found to be higher in older patients (65 years old) than in younger patients (10.9% vs. 1.3%, OR=9.09, p=0.001). The 1-year mortality rate was more frequent in patients with at least one comorbid disease (5.1% vs. 0.8%, OR=6.74, p=0.004), chronic obstructive pulmonary disease (COPD) (25.0% vs. 2.4%, OR=13.69, p=0.001), chronic artery disease (11.5 vs. 2.3%, OR=5.47, p=0.001), and chronic renal failure (29.2% vs. 2.0%, OR=19.9, p=0.001) compared to those with none (Table 1). Figure 1 demonstrates the risk factors for 1-year mortality in patients with COVID-19 in the post-discharge period. However, no significant relationship was detected between the 1-year mortality and the initial symptoms at admission (Table 2).

On chest computed tomography (CT), patients with pleural fluid had a higher 1-year mortality rate than patients without pleural fluid (27.3% vs. 2.3%, OR=16.2, p=0.001) (Table 3).

The median values of leukocyte count (7860/mm^3 vs. 5850/mm^3, p=0.001), neutrophil count (5690/mm^3 vs. 3650/mm^3, p=0.001), monocyte count (740/mm^3 vs. 510/mm^3, p=0.026), C-reactive protein (CRP) (60 mg/L vs. 36 mg/L, p=0.042), procalcitonin (0.13 ng/mL vs. 0.05 ng/mL, p=0.004), urea (44 mmol/L vs. 27 mmol/L, p=0.001), creatinine (1.12 mg/dL vs. 0.73 mg/dL, p=0.001), troponin (59.2 ng/L vs. 3.9 ng/L, p=0.001), lactate dehydrogenase (LDH) (312 UI/L vs. 264 UI/L, p=0.019), and potassium (4.5 mmol/L vs. 4.1 mmol/L, p=0.003) at admission were higher in deceased patients

Table 1. Comparison of the demographic characteristics of deceased and survived patients in the post-discharge 1-year period

		Deceased		Survived		In total			
		n	%	n	%	n	%	p-value	OR
Sex	Male	11	3.70	287	96.30	298	52.56	0.46*	1.44
	Female	7	2.60	262	97.40	269	47.44		
Age, years	<65	6	1.30	451	98.70	457	80.60	**0.001***	0.11
	≥65	12	10.90	98	89.10	110	19.40		
Underlying diseases	Yes	16	5.10	298	94.90	314	55.38	**0.004**†	6.74
	No	2	0.80	251	99.20	253	44.62		
COPD	Yes	5	25.00	15	75.00	20	3.53	**0.001***	13.69
	No	13	2.40	534	97.60	547	96.47		
Diabetes mellitus	Yes	8	5.30	144	94.70	152	26.81	0.09*	2.25
	No	10	2.40	405	97.60	415	73.19		
Hypertension	Yes	9	5.20	163	94.80	172	30.34	0.07†	2.37
	No	9	2.30	386	97.70	395	69.66		
Congestive heart failure	Yes	1	11.10	8	88.90	9	1.59	0.17†	3.98
	No	17	3.00	541	97.00	558	98.41		
Chronic artery disease	Yes	6	11.50	46	88.50	52	9.17	**0.001***	5.47
	No	12	2.30	503	97.70	515	90.83		
Chronic renal failure	Yes	7	29.20	17	70.80	24	4.23	**0.001***	19.9
	No	11	2.00	532	98.00	543	95.77		
Malignancy	Yes	0	0.00	8	100.00	8	1.41	1.00†	-
	No	18	3.20	541	96.80	559	98.59		
Chronic lung disease	Yes	1	11.10	8	88.90	9	1.59	0.17†	3.98
	No	17	3.00	541	97.00	558	98.41		
Bronchial asthma	Yes	2	4.50	42	95.50	44	7.76	0.59†	1.51
	No	16	3.10	507	96.90	523	92.24		

Bold values represent statistical significance at the level of p<0.05. The 1-year mortality was more frequent in patients with at least one comorbid disease, patients with COPD, chronic artery disease, and chronic renal failure compared to those with none.
*Chi-square test, †: Fisher's exact test, COPD: Chronic obstructive pulmonary disease, OR: Odds ratios

than in surviving patients. Only alanine aminotransferase (ALT) at admission was lower in deceased patients than in surviving patients (16 UI/L vs. 23 UI/L, p=0.001) (Table 4).

The 1-year mortality after discharge from the hospital was higher in patients requiring invasive ventilation (12.0% vs. 2.8%, OR=4.79, p=0.019) and intensive care unit (ICU) admission (11.8% vs. 2.6%, OR=4.94, p=0.007) than those with none (Table 5).

Discussion

In this study, we presented a detailed analysis of the predictors of 1-year mortality in 567 hospitalized patients with COVID-19. The 1-year mortality rate was relatively low (3.2%). Older age, COPD, chronic artery disease, chronic renal failure, presence of pleural fluid on chest CT, high levels of leukocyte, neutrophil, monocyte, CRP, procalcitonin, urea, creatinine, troponin, LDH, potassium, and a low level of ALT were associated with increased long-term mortality. Additionally, the need for ICU admission and ventilatory support, including non-invasive ventilation, during the hospital stay for COVID-19 was associated with about a 5-fold increased 1-year mortality.

Recently, new concerns about increased long-term mortality in patients with certain risk factors have arisen (9). Nevertheless, only a few studies have provided information on risk factors or predictors of 1-year mortality (10-12). The 1-year mortality rate was decisively lower in this study compared to the previous studies on community-acquired pneumonia in Turkey (13,14). This might be partly explained by the difference between COVID-19 and other etiological agents of community-acquired pneumonia in the disease severity and their nature. Most patients with COVID-19 during the first period of the pandemic were admitted to isolated wards according to the national guidelines due to the unknown consequences. Thus, hospitalized patients with COVID-19 were younger and had fewer previous history of comorbid diseases. This also explains the long-term better outcomes of COVID-19 in

Table 2. Comparison of the clinical characteristics at first admission of deceased and survived patients in the post-discharge 1-year period

		Deceased		Survived		In total			
			%	n	%	n	%	p-value	OR
Fever	Yes	7	2.20	312	97.80	319	56.26	0.15*	0.48
	No	11	4.40	237	95.60	248	43.74		
Cough	Yes	14	3.20	424	96.80	438	77.25	0.96†	1.03
	No	4	3.10	125	96.90	129	22.75		
Chest pain	Yes	1	6.30	15	93.80	16	2.82	0.48†	2.09
	No	17	3.10	534	96.90	551	97.18		
Myalgia	Yes	1	1.40	72	98.60	73	12.87	0.35†	0.39
	No	17	3.40	477	96.60	494	87.13		
Arthralgia	Yes	0	0.00	21	100.00	21	3.70	0.40†	1.03
	No	18	3.30	528	96.70	546	96.30		
Fatigue	Yes	3	1.50	196	98.50	199	35.10	0.11†	0.36
	No	15	4.10	353	95.90	368	64.90		
Nausea	Yes	1	2.80	35	97.20	36	6.35	0.89†	0.86
	No	17	3.20	514	96.80	531	93.65		
Vomiting	Yes	0	0.00	19	100.00	19	3.35	0.42†	1.03
	No	18	3.30	530	96.70	548	96.65		
Diarrhea	Yes	2	8.00	23	92.00	25	4.41	0.16†	2.86
	No	16	3.00	526	97.00	542	95.59		

No significant relationship was detected between 1-year mortality and initial sypmtoms at admission.
*Chi-square test, †: Fisher's Exact test, OR: Odds ratios

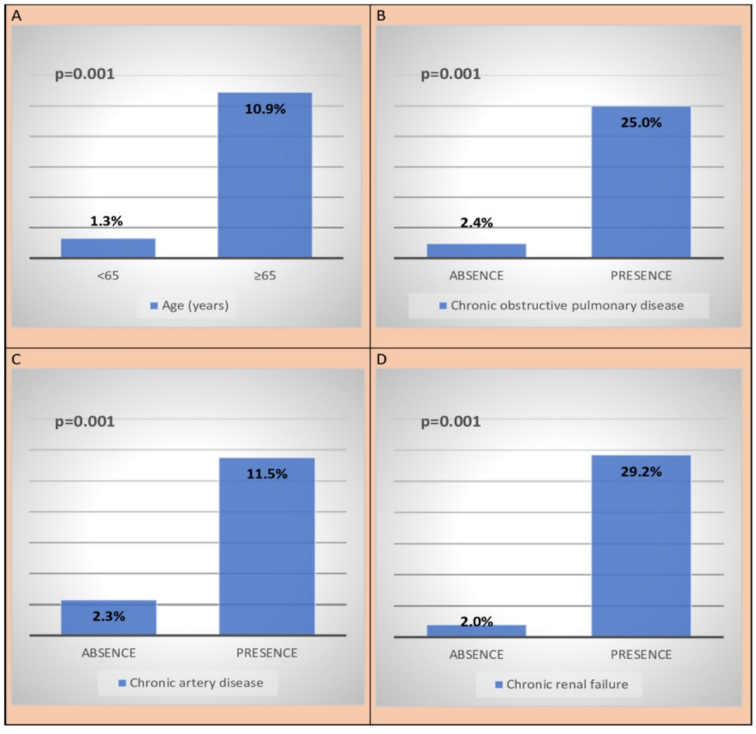

Figure 1. Risk factors for mortality in patients with COVID-19 in the post-dicharge 1-year period (A. Age B. Chronic obstructive pulmonary disease C. Chronic artery disease D. Chronic renal failure)
COVID-19: Coronavirus disease-2019

Table 3. Comparison of the radiological findings at first admission of deceased and survived patients in the post-discharge 1-year period

		Deceased		Survived		In total			
		n	%	n	%	n	%	p-value	OR
Chest graphy findings	Yes	14	4.30	312	95.70	326	70.56	0.13†	3.01
	No	2	1.50	134	98.50	136	29.44		
	Unilateral	2	5.60	34	94.40	36	11.36	0.72†	1.32
	Bilateral	12	4.30	269	95.70	281	88.64		
Chest CT findings	Yes	17	3.10	533	96.90	550	98.39	0.18†	0.26
	No	1	11.10	8	88.90	9	1.61		
Plevral fluid	Yes	6	27.30	16	72.70	22	3.99	**0.001***	16.16
	No	12	2.30	517	97.70	529	96.01		
	Unilateral	2	28.60	5	71.40	7	30.43	1.00†	0.88
	Bilateral	5	31.30	11	68.80	16	69.57		
Small patch	Yes	2	1.60	124	98.40	126	22.83	0.23†	0.41
	No	16	3.80	410	96.20	426	77.17		
Ground-glass opacity	Yes	15	3.10	473	96.90	488	88.41	0.49†	0.65
	No	3	4.70	61	95.30	64	11.59		
Consolidation	Yes	6	3.80	151	96.20	157	28.39	0.64*	1.27
	No	12	3.00	384	97.00	396	71.6		
Air bronchogram	Yes	0	0.00	21	100.00	21	3.80	0.39†	-
	No	18	3.40	514	96.60	532	96.20		
Interlobuler septal thickening	Yes	5	10.40	43	89.60	48	8.68	**0.003***	4.4
	No	13	2.60	492	97.40	505	91.32		
Pulmonary nodules	Yes	0	0.00	43	100.00	43	7.78	0.21†	-
	No	18	3.50	492	96.50	510	92.22		
Pathological lymph node	Yes	1	11.10	8	88.90	9	1.62	0.18†	3.88
	No	17	3.10	528	96.90	545	98.38		

Bold values represent statistical significance at the level of p<0.05. The 1-year mortality was observed more frequent in patients with pleural fluid on chest CT compared to patients without pleural fluid.
*Chi-square test, †: Fisher's Exact test, CT: Computed tomography, OR: Odds ratios

our study compared to community-acquired pneumonia in previous studies.

The 1-year mortality rates vary between studies and range from 1% to 39% depending on the study population (10-12,15-18). Maestre-Muñiz et al. (10) reported that the 1-year mortality in COVID-19 patients applying to emergency departments but not hospitalized was 3.1% (n=10). Additionally, they revealed that the 1-year mortality rate in patients with COVID-19 after discharge from the hospital was 12.8% (n=34). However, they did not evaluate the risk factors or predictors of 1-year mortality. In their study, the higher mortality rates might be explained by the older age of their study population and the higher comorbidities in hospitalized patients. In the study by Maestre-Muñiz et al. (10), of the hospitalized patients with COVID-19, about 70% were older than 65 years and about 90% had at least one underlying disease. In our study, only 19.4% of the cohort was over 65 years old, and 55.3% of patients had a previous history of any comorbidity.

In the study by Akhtar et al. (15), they demonstrated that a high rate of subsequent 1-year mortality (n=28, 17.6%) was associated with increased poor outcomes. They revealed that older age, diabetes mellitus, and post-COVID electrocardiographic findings were associated with an increased risk of long-term mortality. Akhtar et al. (15) showed that about a quarter of patients with diabetes mellitus and 17% of patients with hypertension died one year after recovery from acute COVID-19. In our study, 25% of patients with COPD, 11.5% of patients with chronic artery disease, and 29.2% of patients with chronic renal failure died after discharge in the long-term period.

Chai et al. (11) reported that 3.5% (n=17) of the discharged patients with COVID-19 (n=488) died within the 1-year follow-up in the cohort, while the 1-year mortality rate was 11.4% (n=15) in patients with cancer who had COVID-19. Interestingly, Ceccato et al. (12) demonstrated a low 1-year mortality rate in ICU admitted patients after discharge (1.3%, n=28). Similarly, in another study with comparable findings to our study in terms of

Table 4. Comparison of the vital signs and laboratory parameters at first admission of deceased and survived patients in the post-discharge 1-year period

Parameters	Deceased	Survived	In total	p-value
	Median (IQR)	Median (IQR)	Median (IQR)	
SpO_2 (%)	93 (90-95)	94 (92-96)	94 (92-96)	0.17*
Systolic Blood Pressure (mmHg)	115 (105-120)	120 (110-130)	120 (110-130)	0.293*
Diastolic Blood Pressure (mmHg)	70 (63-80)	70 (70-80)	70 (70-80)	0.536*
Body temperature (°C)	37 (36-37)	37 (36-37)	37 (36-37)	0.653*
Respiratory rate/minute	20 (18-21)	20 (20-22)	20 (20-22)	0.198*
Heart rate/minute	84 (72-97)	87 (80-95)	86 (80-95)	0.614†
Leukocyte count/mm^3	7860 (6400-12130)	5850 (4500-7480)	5900 (4540-7530)	**0.001***
Neutrophil count/mm^3	5690 (4370-8400)	3650 (2790-5130)	3730 (2800-5300)	**0.001***
Lymphocyte count/mm^3	1140 (680-1390)	1380 (1010-1810)	1370 (1005-1800)	0.063*
Monocyte (/*µl*)	740 (430-1010)	510 (370-690)	510 (370-700)	**0.026***
Monocyte (%)	7.7 (5.7-9.9)	8.3 (6.5-10.8)	8.3 (6.5-10.8)	0.353†
Platelet count/mm^3	199 (162-341)	196 (156-240)	196 (156-241)	0.403*
Hemoglobin, (g/dL)	12.6 (12.1-13.7)	13 (12-14)	13 (12-14)	0.423†
Hematocrit, (g/dL)	38.3 (37-41)	39 (36.3-41.5)	39 (36.3-41.5)	0.968*
Glucose, (mg/dL)	107 (90-149)	114 (100-147)	114 (100-147)	0.492*
C-reactive protein, (mg/L)	60 (27.4-166)	36 (13.1-81)	37 (13.9-81.2)	**0.042***
Procalcitonin, (ng/mL)	0.13 (0.07- 0.44)	0.05 (0.03-0.08)	0.05 (0.03-0.08)	**0.004***
Urea, (mmol/L)	44 (37-79)	27 (21-33)	27 (21-34)	**0.001***
Creatinine, (mg/dL)	1.12 (0.8-2.5)	0.73 (0.6-0.9)	0.74 (0.6-0.9)	**0.001***
Ferritin, (ng/L)	97.5 (94-119)	155 (80-307)	152 (80-307)	0.322*
Troponin (ng/L)	59.2 (12.4-288)	3.9 (2.6-7)	3.95 (2.6-7.2)	**0.001***
Fibrinogen (mg/dL)	566 (365-640)	481 (376-574)	482 (376-576)	0.357*
LDH, (UI/L)	312 (261-543)	264 (218-340)	265 (219-341)	**0.019***
Creatine kinase (IU/L)	91 (70-245)	110 (58-194)	109 (59-194)	0.834*
D-dimer, (mg/L)	1.28 (0.4-1.32)	0.64 (0.4-1.04)	0.64 (0.4-1.07)	0.382*
Albumin (g/dL)	38 (36-39)	37 (35-40)	37 (35-40)	0.981†
AST, (UI/L)	27 (18- 34)	31 (24-43)	31 (24-42)	0.057*
ALT, (UI/L)	16 (12-19)	23 (16-35)	23 (16-35)	**0.001***
Sodium (mmol/L)	136 (133-138)	138 (135-139)	138 (135-139)	0.208†
Potassium (mmol/L)	4.5 (4.1-4.8)	4.1 (3.8-4.3)	4.1 (3.8-4.3)	**0.003***
Calcium (mmol/L)	8.7 (8.1-9.2)	8.9 (8.5-9.2)	8.9 (8.5-9.2)	0.187†

Bold values represent statistical significance at the level of p<0.05. The median values of leukocyte count, neutrophil count, monocyte count, C-reactive protein, procalcitonin, urea, creatinine, troponin, lactate dehyrogenase, and potassium at admission were significantly higher in deceased patients than in survived patients. Only ALT at admisson was significantly lower in deceased patients than in survived patients.
*Mann-Whitney U test, †: Independent sample t-test, LDH: Lactate dehydrogenase, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase, IQR: Interquartile ranges

Table 5. Comparison of the need for supportive care during the first hospitalisation for COVID-19 of deceased and survived patients in the post-discharge 1-year period

		Deceased		Survived		In total			
		n	%	n	%	n	%	p-value	OR
Oxygen need	Yes	14	3.8	357	96.2	371	65.4	0.270*	1.88
	No	4	2.0	192	98.0	196	34.6		
Invasive ventilation	Yes	3	12.0	22	88.0	25	4.4	**0.019***	4.79
	No	15	2.8	527	97.2	542	95.6		
Vasopressor need	Yes	1	7.1	13	92.9	14	2.5	0.406*	2.43
	No	17	3.1	536	96.9	553	97.5		
ICU admission	Yes	4	11.8	30	88.2	34	6.0	**0.007***	4.94
	No	14	2.6	519	97.4	533	94.0		

Bold values represent statistical significance at the level of p<0.05. The 1-year mortality after discharge from hospital was higher in patients requiring invasive ventilation and ICU admission than those with none.
*Fisher's exact test, ICU: Intensive care unit, COVID-19: Coronavirus disease-2019, OR: Odds ratios

age and comorbidities, the 1-year post-discharge mortality rate was 1.3% in the cohort (n=32) and 1.8% (n=8) in patients with diabetes mellitus (16). The researchers found that fasting blood glucose was associated with a 4-fold increased risk of 1-year mortality in patients with no history of diabetes mellitus and about an 11-fold increased risk of 1-year mortality in patients with diabetes. However, they did not find a relationship between post-discharge long-term mortality and diabetes mellitus. Akhtar et al. (15) found that a high red cell distribution width and low albumin level on discharge were associated with long-term mortality.

In a prospective cohort of chronic renal failure patients who needed hemodialysis, 25% of the survived patients (n=14) died within the first year (17). Similarly, a quarter of the survivors with chronic renal failure died within the first year in this study. The prevalence of 6-month mortality after hospitalization in mechanically ventilated patients was 38.6% (n=335) in a multicenter Spanish study. However, their analysis included patients who died during the hospital stay, since they did not exclude patients who were discharged from the hospital. The researchers revealed age, diabetes mellitus, neutrophil to lymphocyte ratio, and other factors measured during the ICU stay as predictors of 6-month survival. Chojnicki et al. (18) analyzed patients over 60 years of age and showed that 13.2% (n=30) of surviving patients (n=227) died during the 6-month post-discharge period. They demonstrated that age, cognitive functions, functional capacity, hemoglobin level, and urea were associated with mortality. As a result, various rates of mortality have been observed depending on the characteristics of the cohorts. Additionally, different risk factors and predictors from different studies have been determined for 1-year mortality in COVID-19.

Study Limitations

This study had some limitations. First, this study was retrospectively conducted in a single center. Second, our sample size was small and not generalizable to different populations. Third, we used crude all-cause mortality since causes of death were not determined in the study. Some deaths may not be directly attributable to COVID-19. However, the observed increased re-hospitalisation rates and high prevalence of multiorgan dysfunction in patients with COVID-19 compared to the general population prove that there is a certain association between COVID-19 and the 1-year consequences, including death (15). Finally, we did not evaluate long-term persistent symptoms, pulmonary sequelae and other complications or secondary outcomes including readmission, need for ventilation support, respiratory or multiorgan failure, since the only outcome that we measured was the 1-year mortality, due to the primary objective of this study. However, we had several strengths. First, to our knowledge, this is the first comprehensive study to evaluate 1-year mortality and its predictors in hospitalized patients with laboratory confirmed COVID-19 in Turkey. Second, we included all hospitalized patients during the first period of the COVID-19 pandemic. Third, we could include multiple comorbidities and different types of variables in the analysis.

Conclusion

This study proves that surviving patients still have an ongoing mortality risk even after recovery from acute COVID-19. Additionally, our study provides a list of predictors of 1-year mortality in patients with COVID-19 and suggests that age, underlying diseases, pleural fluid, certain laboratory parameters, and ICU care during the first admission are somewhat associated with 1-year mortality.

Therefore, clinicians should define a comprehensive follow-up plan for survivors and consider close monitoring of patients with these risk factors after discharge from the hospital.

Ethics

Ethics Committee Approval: This study was approved by the Ethics Committee of University of Health Sciences Turkey, Istanbul Haseki Training and Research Hospital (approval number: 102-2022, date number: 08.06.2022).

Informed Consent: Written informed consent was waived because of the retrospective nature of this study.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: S.S., Design: S.S., O.F.B., Data Collection or Processing: S.S., G.T., O.F.B., H.T., B.C., M.Y., E.Z., I.Y.N., Analysis or Interpretation: S.S., O.F.B., Literature Search: S.S., G.T., O.F.B., G.S., F.P., Writing: S.S.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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