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Evaluation of clinical and laboratory findings in patients diagnosed with COVID-19

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ABSTRACT:

Objective: Coronavirus disease 2019 (COVID-19) is an infectious disease that can lead to conditions ranging from mild upper respiratory tract infection to severe clinical manifestations, such as respiratory and multiorgan failure. Thus, this study was aimed at evaluating the clinical and laboratory findings of the patients followed up for COVID-19 in our hospital.

Patients and Methods: A total of 497 patients who were older than 18 years of age and had been diagnosed with COVID-19 were included in this study. Of the 497 patients diagnosed with COVID-19, 57.2% were male and 42.8% were female, and the mean age was 51.59±19.95 years. While the case-death rate was 9.2%, it was 36.8% in the intensive care unit. While lung involvement was detected in 72.2% of the patients, this rate was higher in the patients followed up in the ICU (98.8%).

Results: In the laboratory tests, the leukocytosis, lymphopenia, thrombocytopenia, C-reactive protein, alanine aminotransferase, aspartate aminotransferase, lactate dehydrogenase, creatinine, creatine kinase, ferritin, procalcitonin, and D-dimer levels were higher in the deceased patients than in the surviving patients and were associated with mortality. The neutrophil/lymphocyte ratio was higher in the deceased patients when compared to the other patient groups, and it was also associated with increased mortality. Hypertension (8.6%) and diabetes mellitus (11.2%) were the most common underlying diseases in all of the patient groups.

Conclusions: It was observed that the case-death rate was significantly higher in the ICU and mortality increased with advanced age. Moreover, comorbid factors were higher in patients who were followed up in the ICU and died. In the laboratory examinations, pathological findings were encountered at a higher rate, especially in the patients who died.

Keywords: *COVID-19, Laboratory Findings, Clinical Findings, Mortality.*

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INTRODUCTION

The new virus was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on January 13, 2020, after the pneumonia cluster detected on December 31, 2019, was determined to be a new coronavirus not previously seen in humans. The epidemic spread rapidly to other countries around the world due to its ability to be transmitted from person to person, after being detected in seafood and animal markets in other cities in Hubei Province, especially in Wuhan, China. The first case in Turkey was detected on March 11, 2020[1], the same day that coronavirus disease 2019 (COVID-19) was defined as a global epidemic (pandemic)[2].

Coronaviruses are enveloped RNA viruses within the family of Coronaviridae. SARS-CoV-2 has been defined as the seventh coronavirus to be pathogenic in humans after other types of coronaviruses, which are seasonal human coronaviruses (HCoV), SARS-CoV, and Middle East respiratory syndrome coronavirus (MERS-CoV)[3].

The disease is transmitted from person to person, especially through droplets and close contact. The average incubation period is 5-6 days, but it can take up to two weeks[4,5].

In terms of its clinical spectrum, the disease may progress asymptomatically, but severe clinical conditions such as respiratory failure, sepsis or multiorgan failure may develop[6]. Reverse transcription polymerase chain reaction (RT-PCR) is a diagnostic test used in the diagnosis of COVID-19[7,8]. Although there are false positives in asymptomatic patients, the specificity of the RT-PCR test seems to be quite high. It was reported[7,9] that the test's sensitivity is around 66-80%. The case fatality rate of the disease was reported[10] to be between 3.4% and 11%. Several risk factors associated with the development of severe COVID-19 have been identified[11], which include advanced age, male gender, respiratory and cardiovascular disease, hypertension (HT), diabetes (DM), cancer, and obesity.

This study aimed at evaluating the clinical and laboratory findings of patients followed up for COVID-19.

PATIENTS AND METHODS

Study Population and Data Collection

Patients who were older than 18 years of age, had clinical symptoms and signs, had SARS CoV-2 PCR-positivity, and were evaluated as COVID-19-positive were included in this study.

Patients

They were categorized into 2 separate groups as:

- Group 1: those followed up in the intensive care unit (ICU);
- Group 2: those followed up in the wards.

The patients followed up in the ICU were divided into:

- Group 1a: those who were followed up and discharged in the ICU;
- Group 1b: those who were followed up in the ICU and died.

Information about the patients was obtained and recorded by retrospectively examining the Hospital Information Management System and patient files. Age, gender, body mass index (BMI), chronic diseases, clinical symptoms, blood groups and laboratory results were evaluated.

The results of patient tests such as hemogram, biochemical tests, C-reactive protein (CRP), sedimentation, procalcitonin, vitamin B_{12}, ferritin, D-dimer, coagulation parameters, 25-Hydroxy Vitamin, AB0 RH reverse blood group, blood gas, and reference values were also recorded.

Ethical Consideration

Ethical approval was obtained for the study by the Health Sciences University Van Training and Research Hospital Clinical Research Ethics Committee with the number 2022/12-03, dated 01/06/2022. All procedures in the study were performed in accordance with the World Medical Association's Declaration of Helsinki.

Statistical Analysis

In calculating the sample size of the study, the Power (power of the test) for each variable was determined by taking at least 80% and a type 1 error of 5%. The Kolmogorov-Smirnov ($n < 50$) and Skewness-Kurtosis tests were used to check whether the continuous measurements were normally distributed, and since the measurements were normally distributed, parametric tests were applied. Descriptive statistics for the continuous variables were expressed as the mean and standard deviation, while for the categorical variables, they were expressed as numbers (n) and percentages (%). The Independent *t*-test and One-Way Analysis of Variance (ANOVA) were performed in comparison of the measurements according to the categorical groups. The Duncan post-hoc multiple comparison test was used to identify the differences between the groups following ANOVA. The Fisher's Exact Chi-Square test was used to examine the association between the categorical variables. The statistical significance level (a) was taken as 5% in the calculations and IBM SPSS Statistics for Windows 25.0 (IBM Corp., Armonk, NY, USA) was used for the analyses.

RESULTS

Of the 497 patients who were between 18 and 106 years of age and had been diagnosed with COVID-19, 57.2% were male (n = 284) and 42.8% were female (n = 213), and a statistically significant correlation was found in terms of the incidence of the disease. The mean age was

Table 1. Number of patients and age distribution in the groups.

Groups	Females		Males		Total	
	N (%)	Age, median (OR)	N (%)	Age, median (OR)	N (%)	Age, median (OR)
Group 1a	31 (6.2)	68.6±11.7	48 (9.6)	61.5±12.3	79 (15.8)	64.3±12.5
Group 1b	17 (3.4)	78.2±11.18	29 (5.8)	68.4±13.31	46 (9.2)	71.79±13.2
Group 2	165 (33.1)	47.83±20.20	207 (41.6)	45.32±18.33	372 (74.8)	46.43±19.21
Total	213 (42.8)	53.1±21.10	284 (57.1)	50.4±18.97	497 (100)	51.59±19.95

OR: Odds Ratio.

51.59 ± 19.95 years. There were 79 patients in Group 1a, 46 patients in Group 1b, and 372 patients in Group 2. All of the patients hospitalized in the ICU consisted of patients who were followed up in the service and taken to the ICU. While the mean age of the patients in Group 1b was 71.79 ± 13.2 years, that for the patients in Group 2 was 46.43 ± 19.21 years, and for the patients in Group 1a it was 64.3 ± 12.5 years, and the mean age of the patients who died was significantly higher (Table 1).

Death was observed in 9.2% (n = 46) of the 497 patients followed up. The case-death rate was higher in the males (63%) than in the females (37%). It was found that the mortality rate increased with age and there was a significant relationship in the statistical evaluation ($p = 0.001$).

Of the 497 patients, 125 (25.1%) required intensive care, and 46 (36.8%) of these patients who were followed up in the ICU died. While 3 (3.7%) of the living patients who needed intensive care needed mechanical ventilation, 36 (78.2%) of the deceased patients needed mechanical ventilation, and the difference between the groups was statistically significant ($p = 0.001$, Table 2).

Additional disease was found in 64 (81%) patients in Group 1a, 37 (80%) patients in Group 1b, and 87 (23.4%) patients in Group 2, which was statistically significant in the patients followed up in the ICU ($p = 0.001$, Table 2).

The most commonly described symptoms at first admission were respiratory symptoms with fever, myalgia, headache, malaise, gastrointestinal symptoms, and loss of taste and/or smell. According to the computed tomography (CT) results, 359 (72.2%) patients had lung involvement (Figures 1-4).

Table 2. Distribution of age, gender, symptoms, comorbidities and some other parameters among the groups.

		Group 2		Group 1a		Group 1b		*p*-value*
		N	%	N	%	N	%	
Gender	F	207	55.6	48	60.8	29	63.0	0.492
	M	165	44.4	31	39.2	17	37.0	
BMI	<30	57	15.3	40	50.6	28	60.9	0.001
	>30	315	84.7	39	49.4	18	39.1	
Additional disease	Diabetes Mellitus	22	5.9	18	22.7	16	34.7	0.001
	Hypertension	24	6.4	15	18.9	4	8.6	
	Chronic Renal Disease	3	0.8	6	7.5	5	10.8	
	Cardiovascular Disease	22	5.9	11	13.9	4	8.6	
	Pulmonary Disease	9	2.4	11	13.9	6	13.0	
	Malignancy	7	1.8	3	3.7	2	4.3	
Symptom	Fever	78	20.9	52	65.8	31	67.3	0.001
	Respiratory System Symptoms	179	48.1	67	84.8	36	78.2	
	Myalgia, Headache, Fatigue	101	27.1	75	94.9	41	89.1	
	Gastrointestinal Symptoms	17	4.5	12	15.1	6	13.0	
	Loss of taste and/or smell	52	13.9	0	0	0	0	
CT	Negative	135	36.2	1	1.2	2	4.3	0.001
	Positive	237	63.8	78	98.8	44	95.7	
ICU	Yes	0	0.0	79	100.0	46	100.0	0.001
	No	372	100.0	0	0.0	0	0.0	
Intubation	Yes	1	0.3	3	3.7	33	71.7	0.001
	No	371	99.7	76	96.3	13	28.3	
Blood group	Rh (+) Positive	158	90.8	25	86.2	10	83.3	0.001
	Rh (-) Negative	16	9.2	4	13.89	2	16.7	

* Significance level according to Chi-square test results.
ICU: Intensive Care Unit; CT: Computerized Tomography.

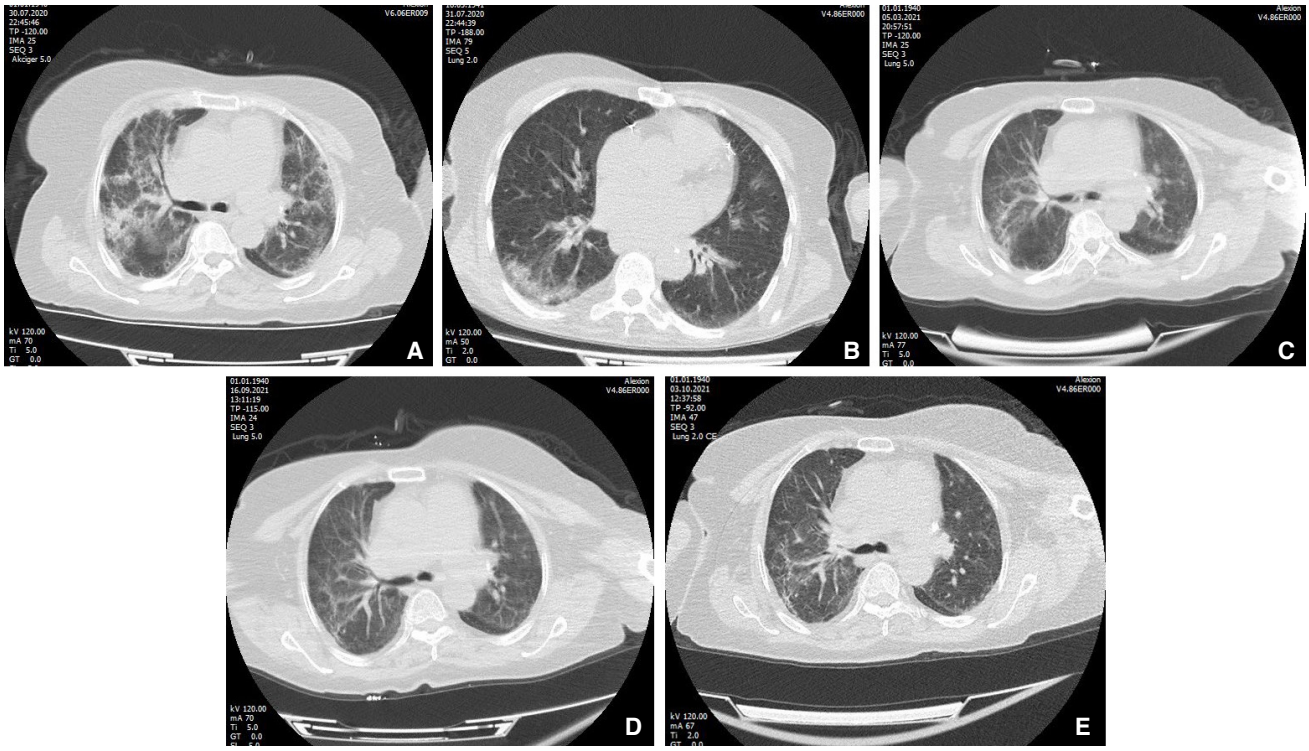

Figure 1. A-E, in an 80-year-old female patient, peripheral areas of infiltration are observed in both lungs, and sequelae changes *(White arrows)* are still observed 14 months later.

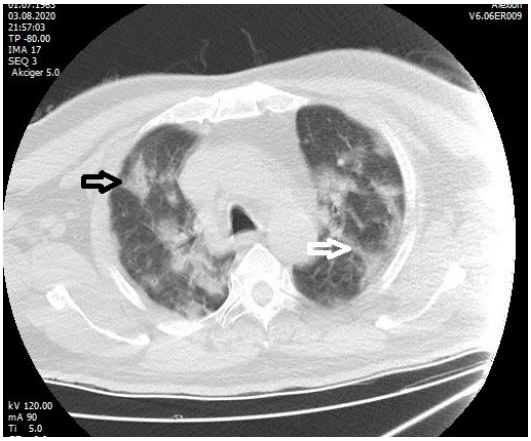

Figure 2. A 57-year-old male patient has areas of consolidation *(black arrow)* and atelectasis *(white arrow)* in both lungs.

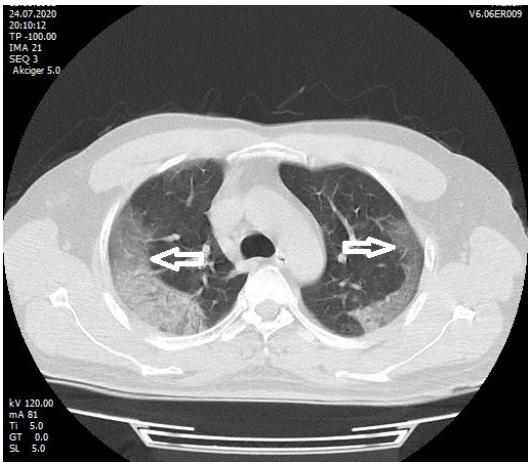

Figure 3. A 58-year-old female patient has ground glass infiltration *(white arrow)* in the upper lobe and peripheral area of both lungs.

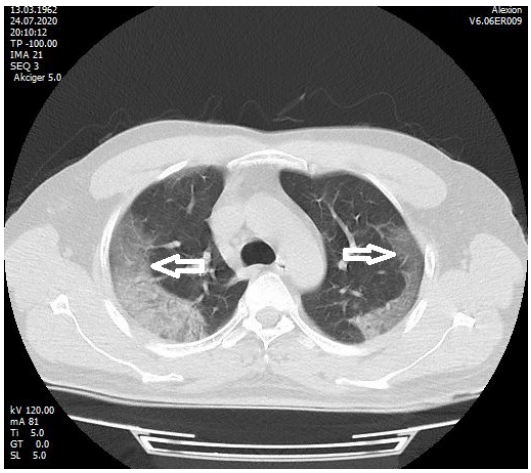

Figure 4. In a 55-year-old male patient, crazy-pawing areas *(white arrow)* are observed in the peripheral area of both lungs.

Various degrees of lung involvement were present in 98.8% of the patients in Group 1a, 95.7% of the patients in Group 1b, and 63.8% of the patients in Group 2. The lung involvement rate of patients requiring intensive care (Groups 1a and 1b) was statistically significant when compared to Group 2 ($p = 0.001$, Table 2).

The mean laboratory test values of the patients are shown in Table 3. When the relationship between COVID-19 severity and the laboratory data was hematologically evaluated according to Group 2 in the patients in Group 1, according to Group 1a in the patients in Group 1b, leukocytosis, lymphopenia, and thrombocytopenia were found to be higher and statistically significant ($p = 0.001$). When the same event was evaluated biochemically in the same groups hyperglycemia, hypocalcemia, elevation of CRP, aspartate aminotransferase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH), gamma glutamyl transferase (GGT),

Table 3. Comparison results of laboratory data by groups.

Laboratory tests (ref. range/unit)	Group 2 OR	Group 1a OR	Group 1b OR	*p*-value*
White blood cell (4-10) 10^9/L- highest value	6.71b	4.99c	18.81a	0.001
White blood cell- lowest value	4.76c	11.84a	6.07b	0.001
Lymphocyte (0.80-4.00 10^9/L)	1.54a	0.83b	0.47c	0.001
C reactive protein (0-8 mg\L)	28.00b	123.62b	790.87a	0.001
Glucose (65-100 mg/dl)	118.97c	222.06b	315.63a	0.001
Potassium (3.5-5.1 mmol\L)	6.98	6.43	3.96	0.681
Sodium (135-146 mmol/L)	136.24	132.49	134.18	0.403
Vitamin B12 (190-866 pg\ml)	357.71	358.46	433.98	0.201
Ferritin (30-400 ng/ml)	313.41c	765.85b	1332.44a	0.001
Chlorine (98-108 mmol\L)	105.21	100.62	99.72	0.505
Bilirubin (total) (0-1.1 mg\dl)	1.91	0.89	9.86	0.115
Procalcitonin (0-0.046 ng/mL)	0.12	0.99	11.70	0.001
Magnesium (1.7-2.55 mg/dL)	5.90	1.95	2.02	0.447
D-dimer (0-240 ng/ml)	433.99b	1695.56b	8846.71a	0.001
Iron (37-157 ug\dl)	60.58	48.65	78.34	0.243
İnternational Normalized Ratio (INR) (0.9-0.2)	1.67	1.22	1.44	0.897
Lactate dehydrogenase (Serum) (120-240 U\L)	247.85c	470.88b	1286.09a	0.001
Gamma glutamyltranspeptidase (0-49 U\L)	41.58c	80.17b	129.81a	0.001
25-Hydroxy Vitamin D	15.41	18.54	15.36	0.340
Albumin (3.5-5 g\dl)	4.25	3.10	5.93	0.216
Blood Urea Nitrogen (0-50 mg\dl)	30.90c	70.23b	159.21a	0.001
Triglyceride	170.93c	211.27b	281.32a	0.001
Calcium (8.2-10.5 mg\Dl)	8.55a	7.73b	7.12c	0.001
Alanine aminotransferase (0-40 U\L)	37.25b	79.98b	350.61a	0.001
Creatinine (0.1-1.2 mg/dl)	1.01c	1.64b	3.47c	0.001
Prothrombin time (10.2-13.9 sec)	14.31	15.02	17.75	0.247
Iron Binding Capacity (112-347 ug\dl)	223.35a	193.95b	164.70c	0.001
Troponin I (0.00-0.160 ng/mL)	0.11	11.37	2.44	0.075
Activated partial thromboplastin time (25.4-36.9 sec)	31.66b	37.53b	51.91a	0.001
Creatine kinase (0-170 U\L)	115.55c	292.75b	1011.96a	0.001
Aspartate aminotransferase (0-37 U\L)	33.26b	74.30b	490.55a	0.001
Platelets (100-400 10^3/uL)	226.37a	217.54a	143.46b	0.001
Monocyte (0.12-1.20 10^9/L)	0.59	2.54	0.22	0.176
Hemoglobin (11-16 g/dL)	14.75a	12.33ab	11.36b	0.006
Lactate (0.5-1.6 mmol/L)	15.53	2.35	5.36	0.677
Eosinophil (0.2-0.5 10^9/L)	0.10b	0.14ab	0.21a	0.003
Neutrophil (2-7 10^9/L)	3.47c	5.39b	7.72a	0.001
Fibrinogen (238-498 mg/dl) Highest	344.71	368.71	392.10	0.507
‘Fibrinogen (238-498 mg/dl) Lowest	250.94b	543.75a	494.33a	0.008
Erythrocyte Sedimentation Rate (0-20/h)	31.32	51.60	33.70	0.354
CK-Mb (0-25 U\L)	22.23c	32.47b	55.14a	0.001
Cholesterol (35-201 mg\dl)	130.16b	157.24a	136.19b	0.036

*Significance levels according to one-way ANOVA test results. a, b, c: Show the difference between groups (Duncan post-hoc test). OR: Odds Ratio.

Table 4. Comparison of death-living groups.

Laboratory tests (ref. range/unit)	Died Mean	Living Mean	*p*-value*
White blood cell (4-10) 10^9/L- highest value	18.81	6.40	0.001
Lymphocyte (0.80-4.00 10^9/L)	0.47	1.41	0.001
C reactive protein (0-8 mg\L)	790.87	44.89	0.001
Glucose (65-100 mg/dl)	315.63	138.44	0.001
Ferritin (30-400 ng/ml)	1,332.44	396.10	0.001
Bilirubin (total) (0-1.1 mg\dl)	9.86	1.72	0.040
Procalcitonin (0-0.046 ng/mL)	11.70	0.30	0.001
D-dimer (0-240 ng/ml)	8,846.71	647.92	0.001
Lactate dehydrogenase (120-240 U\L)	1,286.09	291.00	0.001
Gamma glutamyltranspeptidase (0-49 U\L)	129.81	51.33	0.001
Blood Urea Nitrogen (0-50 mg\dl)	159.21	38.17	0.001
Triglyceride	281.32	181.72	0.001
Calcium (8.2-10.5 mg\dL)	7.12	8.40	0.001
Alanine aminotransferase (0-40 U\L)	350.61	45.09	0.001
Creatinine (0.1-1.2 mg/dl)	3.47	1.13	0.001
Activated partial thromboplastin time (25.4-36.9 sec)	51.91	32.98	0.001
Creatine kinase (0-170 U\L)	1,011.96	149.34	0.001
Aspartate aminotransferase (0-37 U\L)	490.55	40.78	0.001
CK-Mb (0 - 25 U\L)	55.14	26.94	0.001

*Significance levels according to independent *t*-test results.

triglyceride, blood urea nitrogen, creatinine, creatine kinase (CK), ferritin, bilirubin (total), procalcitonin, D-dimer, CK-Mb, and aPTT as coagulation parameter were found to be higher and statistically significant ($p = 0.001$). The higher incidence of disorders in these parameters, especially in the deceased patient group, was considered to be associated with increased mortality (Table 4). While the 25-Hydroxy Vitamin D level was low in all of the patient groups, no statistically significant difference was observed ($p = 0.340$).

The proportion of patients with a neutrophil/lymphocyte ratio (NLR) > 5 was 94.6% in Group 1b, 64.2% in Group 1a, and 14.3% in Group 2. The increase in NLR was statistically significant and associated with mortality in patients who were in Group 1b.

Hypertension (8.6%) and diabetes mellitus (11.2%) were the most common underlying diseases in all of the patient groups. Chronic renal failure (CKD), DM, and malignancy were higher in the patients in Group 1b. It was determined that mortality increased with increasing age and comorbid diseases. When age and comorbid diseases were examined separately between the groups, a statistically significant relationship was found ($p = 0.001$, $p = 0.001$).

The number of patients with Rh(+)blood (88.9%) was significantly higher than the number of patients with Rh(–) blood (11.1%), and the difference between them was statistically significant ($p = 0.001$, Table 5). The rate of those with type A blood in Group 1a was 37.9% (29/11), the rate of those with type 0 blood in Group1b

Table 5. Distribution of blood groups.

Blood Group	Service		ICU*		Died	
	N	%	N	%	N	%
0 Rh (+) Positive	41	23.5	8	27.5	5	41.6
0 Rh (-) Negative	1	0.5	0.0	0.0	1	8.3
A Rh (-) Negative	10	5.7	1	3.4	0.0	0.0
A Rh (+) Positive	77	44.2	10	34.4	1	8.3
AB Rh (-) Negative	2	1.1	2	6.8	1	8.3
AB Rh (+) Positive	11	6.3	0	0	3	25.0
B Rh (+) Positive	29	16.6	7	24.1	2	16.6
B Rh (-) Negative	3	1.7	1	3.4	0	0.0

*ICU: Intensive Care Unit.

was 50% (12/6), and the rate of those with type A blood in Group 2 was 50% (174/87). The relationship between COVID-19 and the Rh blood type was statistically significant ($p = 0.001$).

It was determined that the severity of the disease increased as the BMI increased in patients who needed intensive care and died, and the difference was statistically significant (Table 2).

DISCUSSION

This study aimed at evaluating the epidemiological, clinical, and laboratory tests of patients hospitalized in the service or ICUs due to COVID-19, as well as laboratory tests affecting the morbidity and mortality of the disease, and comorbid factors.

While 25.1% of the patients were followed up in the ICU, the case-death rate was 9.2% among all of the patients, and this rate was 36.8% in those followed up in the ICU. Mechanical ventilation was required in 0.8% of the surviving patients, while 71.7% of the deceased patients required mechanical ventilation. In a meta-analysis[12], the rate of patients admitted to the ICU was 10.96%, the requirement for mechanical ventilation was 7.1%, and the mortality rate was 5.6%. In a study[13] conducted in China, where the disease first began to spread, it was shown that 5% of the patients were followed up in the ICU, invasive mechanical ventilation was applied to 2.3%, and 1.4% died. In the study of Teker et al[14] in Turkey, while the case-case fatality rate was 7.8%, it was seen that 7.6% of the patients were treated in the ICU and 78% of the patients hospitalized in the ICU died.

In this study, 57.2% of the patients were male, 42.8% were female, and the mean age was 51.59 years. It was determined that the average age (71.5 years) of the patients who died in the ICU was higher than in the other groups. Li et al[12] reported that the mean age was 46.7 years, 51.9 of the patients were male and 48.95% were female, the mean age of those with severe disease was 60 years, and 61% of these patients were male.

Italy has been one of the countries most affected by the COVID-19 pandemic. In a study[15] involving patients in the ICU in the Lombardia region of Italy, it was shown that the mean age was 63 years and 82% of the patients were male. In another study[16] evaluating 5,700 patients who were hospitalized in New York, USA, it was shown that the mean age of all of the patients was 63 years and 39.7% were female, while the mean age of the patients followed up in the ICU was 68 years and 33.5% were female. In a meta-analysis[17], it was determined that the risk of contracting COVID-19 infection was 65% higher in patients over the age of 70, and at the same time, the risk of severe illness, need for intensive care, and death was higher if the disease developped. In the same study[17], it was determined that the risk of contracting COVID-19, severe disease and mortality were higher in males.

To date, several risk factors associated with the development of severe COVID-19 infection in different populations have been identified. Among them are male gender, advanced age, obesity, respiratory diseases, cardiovascular diseases, and comorbid conditions such as HT, DM, and cancer[11]. In a systematic review[18], it was stated that 36.8% of COVID-19 patients presented with comorbidities, and the most common diseases were HT (18.6%), cardiovascular disease (14.4%), and DM (11.9%). The most common comorbidities detected in a meta-analysis[19] from China were HT (21.1%), DM (9.7%), cardiovascular diseases (8.4%), and respiratory system diseases (1.5%). In the study of Sümer et al[20], it was found that 24.8% of the patients had HT, 17.4% had DM, and 10.7% had a cardiovascular disease, while 36.9% of the patients had no underlying diseases. In this study, HT (8.6%) and DM (11.2%) were the most common underlying diseases. Chronic renal failure, DM, and malignancy were higher in the patients who died in the ICU when compared to the other groups. It was determined that mortality increased with increasing age and comorbid diseases.

Hematological, biochemical, and coagulation tests and acute phase reactants show pathological changes in patients infected with COVID-19. Among the hematological changes, lymphopenia, leukocytosis, leukopenia, and mild thrombocytopenia can be observed[20,21]. In addition, prolonged activated thromboplastin time (aPTT) and prothrombin time (PT), increased LDH, increased liver function tests, neutrophilia, eosinopenia, increased CRP have been shown[21]. Severe COVID-19 picture has been associated[22] with higher white blood cell (WBC), CRP, D-dimer, LDH and AST levels, and lower lymphocyte, platelet, and hemoglobin levels. In another study[23], blood urea, creatinine, WBC, neutrophil count, D-dimer, serum ferritin and LDH levels were higher in deceased patients when compared to surviving patients. In addition, high CRP levels, low CD4+T lymphocyte count, low C3 levels, low platelet levels, and severe lymphopenia were also common in patients who died[22]. In a study[24] conducted in China, lymphocytopenia (64.5%), CRP increase (44.3%), LDH increase (28.3%), and leukocytopenia were observed more frequently in COVID-19 patients (29.4%). In another study[13], lymphocytopenia was found in 83.2% of the patients, thrombocytopenia in 36.2%, and leukopenia in 33.7% of the patients at the first admission, as well as high CRP levels in most of them and, less frequently, ALT, AST, CK and D-dimer elevations. In patients with severe disease, more prominent laboratory abnormalities (including lymphocytopenia and leukopenia) were observed. Gharamani et al[25], in a meta-analysis that they conducted comparing patients who had severe illness with those who did not, a significant decrease was observed in the lymphocyte, monocytes, eosinophil, hemoglobin, platelet, albumin, serum sodium, lymphocyte/CRP ratio (LCR), leukocyte-IL-6 (LeIR) ratio, neutrophil, ALT, AST, total bilirubin, blood urea nitrogen (BUN), creatinine, sedimentation, CRP, procalcitonin (PCT), LDH, fibrinogen, PT, D-dimer, while glucose neutrophil lymphocyte ratio (NLR) were increased. Gumus et al[26] found a significantly lower lymphocyte count in asymptomatic COVID-19 patients in the pediatric age group when compared to healthy vol-

unteers. In this study, in those who died in the ICU compared to those who survived, and in those followed up in the ICU compared to those followed up in the normal services, leukocytosis, lymphopenia, thrombocytopenia, hyperglycemia, hypocalcemia, elevated CRP, increased ALT, increased AST, increased LDH, increased GGT, increased triglyceride, increased blood urea nitrogen, increased creatinine, increased CK, increased ferritin, increased bilirubin (total), increased PCT, D-dimer increase, CK-Mb elevation and aPTT elevation were found to be higher (p = 0.001). The higher incidence of disorders in these parameters, especially in the deceased patient group, was considered to be associated with increased mortality.

Most patients with severe COVID-19 have low lymphocyte counts, high leukocyte counts, and NLR levels, as well as lower percentages of monocytes, eosinophils, and basophils[27]. In many studies[28-31], the NLR is thought to have a prognostic role in various inflammatory diseases and oncological processes. Normal NLR values in an adult in the healthy non-geriatric population have been reported to be between 0.78 and 3.53 and are expressed as a simple parameter to easily assess inflammatory status. In a study, high NLR levels were correlated with COVID-19 disease severity and increased mortality. In a study[32] conducted in Iran, high NLR levels were associated with an increased one-month mortality risk. In another study[33], the NLR was characterized as an independent predictor of clinical outcomes in patients with COVID-19. In a meta-analysis, higher neutrophil counts and NLR, and lower lymphocyte counts were observed in severe cases of COVID-19 when compared to non-severe cases. It was stated that these markers can help to monitor and predict the severity and prognosis of COVID-19[34]. In this study, the rate of patients with NLR > 5 who died (94.6%) was significantly higher than in the other patient groups and was associated with mortality.

CONCLUSIONS

The COVID-19 pandemic has caused high morbidity and mortality in Turkey, as well as all over the world. Despite vaccine studies and effective drug studies, the emergence of new variants further complicates the situation. In this study, which aimed to evaluate the demographic, clinical, and laboratory findings of patients diagnosed with COVID-19 and examine the factors affecting mortality, it was observed that the case-mortality rate was high in the ICU and mortality increased significantly with advanced age. It was observed that comorbid factors, especially hypertension, were more common in patients who were followed up in the ICU and died. In the laboratory examinations, pathological findings were found at a higher rate, especially in the patients who died. As COVID-19 continues to threaten humanity, the production of more effective and accessible treatment options and vaccines to prevent the disease that are not affected by different variants are seen as the surest and fastest solution for the end of COVID-19.

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We declare that we have no conflicts of interest.

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