Clinical Section: Research Article

Clinical Features of the 60 Years and Older Patients Infected with 2019 Novel Coronavirus: Can We Predict Mortality Earlier?

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Abstract

Introduction: The novel coronavirus (COVID-19), which has affected over 100 countries in a short while, progresses more mortally in elderly patients with comorbidities. In this study, we examined the epidemiological, clinical, and laboratory characteristics of the patients aged 60 and over who had been infected with COVID-19. *Methods:* The data of the patients admitted to the hospital within 1 month from May 8, 2020 onwards and hospitalized for COVID-19 pneumonia were obtained from the hospital medical records, and the epidemiological, clinical, and laboratory parameters of the patients during the admission to the emergency department were examined. Patients were divided into 2 groups regarding the criteria of having in-hospital mortality (mortality group) and being discharged with full recovery (survivor group). The factors, which could have an impact on the mortality, were investigated using a univariate and multivariate logistic regression analysis. *Results:* This retrospective study included 113 patients aged 60 years and older, with a confirmed diagnosis of COVID-19 pneumonia. The mean age of the patients was 70.7 ± 7.9, and 64.6% ($n = 73$) of them were male. The mortality rate was 19.4% ($n = 22$). Among the comorbid illnesses, only renal failure was significant in the mortality group ($p = 0.04$). A CURB-6**5** score ≥ 3 or pneumonia severity index (PSI) class ≥ 4 manifested a remarkable discrimination ability to predict 30-day mortality ($p < 0.001$). When the laboratory parameters were considered, the value of neutrophil to lymphocyte ratio (NLR) was significant in predicting mortality in univariate and multivariate analysis (odds ratio [OR] = 1.11; 95% confidence interval [95% CI], 1.03–1.21; $p = 0.006$, and OR = 1.51; 95% CI, 1.11–2.39; $p = 0.044$, respectively). *Conclusion:* In our study, NLR was determined to be an independent marker to predict in-hospital mortality among patients with COVID-19. PSI and CURB-65 revealed a considerably precise prognostic accuracy for the patients with COVID-19 in our study as well. Moreover, thanks to that NLR results in a very short time, it can enable the clinician to predict mortality before the scoring systems are calculated and hasten the management of the patients in the chaotic environment of the emergency room.

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Introduction

Over the last 2 decades, the infections of severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV), which have higher mortality rates (10 and 37%, respectively) and are from the family of betacoronavirus, have affected >10,000 patients adversely and led to epidemics [1]. Humankind has been struggling with a novel coronavirus pandemic since late December 2019. The novel coronavirus (SARS-CoV-2 or COVID-19), which was insulated from the lower respiratory tract of the patients who had pneumonia with an unknown cause in Wuhan, Hubei province of China, for the first time, generated a pandemic in a short while and affected many countries [2]. The specific treatment of COVID-19 has not been found out yet; the mortality rate is between 2.2 and 3.7%, and this rate is above the mortality rate of influenza [3, 4]. It has been reported that COVID-19 progresses with higher mortality among elderly patients with comorbidities (diabetes, hypertension, cardiovascular disease, and cerebrovascular disease) [5]. In a study performed with 4,021 patients, the mortality rate was found to be 5.3% in patients aged 60 and over, whereas it was 1.4% in patients younger than 60 years old [5]. Meanwhile, the mortality rate due to COVID-19 in patients aged 60 and over was 63.6% based on the data reported from Wuhan [6]. These high mortality rates point out the severity of the prognosis of COVID-19 pneumonia, particularly in the elderly.

Mortality rate is calculated using 20 clinical and investigational variables with the pneumonia severity index (PSI), which is one of the most widely used scoring systems in the management of the patients with community-acquired pneumonia, and based on this scoring, the process of patient care, hospitalization, or admission to the intensive care unit can be decided [6]. In a study conducted with 56 patients, PSI class IV and V were determined to be significant in the COVID-19-infected patient group who were aged 60 years and older, compared to the younger and middle age groups [5]. CURB-65 is a scoring system that disregards the impact of comorbidities in community-acquired pneumonia and computes the mortality risk with merely 5 variables [7].

It has been revealed that apart from scoring systems, the increased levels of D-dimer, ferritin, and CRP, which are among the laboratory parameters, can also predict poor prognosis; however, the results of these parameters may take time and be more costly in the circumstances of the emergency department, whereas the neutrophil to lymphocyte ratio (NLR) is a parameter that can be easily computed with the NLR from the complete blood count parameters and can be studied in a shorter time in the laboratory [8]. It has been reported in the literature that the high levels of NLR, including inflammatory diseases, malignancy, cardiovascular diseases, acute pulmonary embolism, ischemic stroke, and polymyositis, end up with a poor clinical outcome [9, 10].

In this study, we aimed to investigate the factors, which have an impact on mortality through examining the clinical and laboratory characteristics of the patients aged 60 years and older infected with COVID-19 who had presented to our emergency department and to scrutinize the effects of the patients' PSI and CURB-65 scores on predicting mortality.

Materials and Methods

In this study, 113 confirmed cases of SARS-CoV-2 pneumonia aged 60 and over admitted to the emergency department of the University of Health Sciences Haydarpasa Numune Training and Research Center during a month from March 8, 2020 were collected retrospectively. If patients who presented with respiratory system symptoms, such as cough, fever, and shortness of breath, had typical lung tomography findings and the viral nucleic acid test (RT-PCR assay with oropharyngeal and nasopharyngeal swab specimens) was positive for at least one time, they were diagnosed with COVID-19 pneumonia. In line with the literature, different degrees of parenchymal ground-glass opacities, multifocal consolidative pulmonary opacities with/without rounded morphology, crazy paving sign, and peripheral lung distribution were considered as typical lung tomography findings of COVID-19 pneumonia [11–13].

Age, gender, history of comorbid diseases, staying at home or nursing home, vital signs during the admission to the emergency room (respiratory rate, systolic and diastolic blood pressure, fever, oxygen saturation, heart rate), state of consciousness, blood gas analysis, electrolytes (sodium, chloride, calcium, potassium), values of glucose, hematocrit, hemoglobin, BUN, AST, ALT, D-dimer, ferritin, procalcitonin, neutrophil, leukocyte, lymphocyte, and findings of lung tomography as well as the result of RT-PCR and state of mortality or discharge were obtained from the epicrisis report of the patients, and PSI and CURB-65 scores of the patients during the admission to the emergency department were calculated. In this study, the patients were divided into 2 groups as in-hospital mortality (group 1) and survivor (group 2). The significance level of the abovementioned parameters between the 2 groups was analyzed, and factors that were effective in mortality were investigated.

Values of mean, SD, median, minimum, maximum, frequency, and rate were used in the descriptive statistics of the data. The normality of distribution for variables was measured using the Kolmogorov-Smirnov test. ANOVA (Tukey's test), independent sample t test, Kruskal-Wallis, and Mann-Whitney U test were used for the analysis of independent quantitative variables. Paired sample t test and Wilcoxon's test were used in the analysis of the dependent quantitative variables. χ^2 test was used for the analysis of qualita-

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tive independent variables, and the Fisher test was used when χ^2 test conditions were not met. Pearson and Spearman correlation analysis was used for the correlation analysis of the variables. The effect size was investigated through univariate and multivariate logistic regression. The receiver operating characteristic (ROC) curve analysis was performed to determine the optimal cutoff point of study parameters for mortality, and area under the curve (AUC), sensitivity, specificity, PPV, and NPV were calculated and reported with 95% confidence interval (95% CI). The statistical analysis was conducted using the software of SPSS 26.0. The findings were considered statistically significant at $p < 0.05$.

Results

A total of 113 elderly patients who had been diagnosed with COVID-19 pneumonia were included in this study. The mean age of the patients was 70.7 ± 7.9, and 64.6% ($n = 73$) of them were male. The mortality rate was 19.4% ($n = 22$). None of the patients had a history of living in a nursing home. All patients included in this study were hospitalized in the ward or intensive care unit after being examined in the emergency department. Demographic characteristics, comorbid diseases, and laboratory parameters of the 113 patients are presented in Table 1. The duration of the symptom onset for the patients before admission to hospital was 6.1 ± 4.8 days (median, 5.0 days), and the most common complaints were fever 62.8% ($n = 71$), cough 61.9% ($n = 70$), dyspnea 31.9% ($n = 36$), weakness 23.9% ($n = 27$), sputum 17.7% ($n = 20$), nausea-vomiting 8.8% ($n = 10$), sore throat 8.8% ($n = 10$), and diarrhea 6.2% ($n = 7$).

Upon subdividing the patients into 2 groups, namely, mortality and survivor group (patients discharged with full recovery), the findings showed that there was no significant difference between the 2 groups regarding the distribution of age and gender ($p > 0.05$). When the patients included in our study were examined in 2 groups as young-old (60–74 years [$n = 78$]) and old-old (75 years [$n = 35$]), there was no significant difference in mortality between the 2 groups (15.4% [$n = 12$] vs. 28.6% [$n = 10$], respectively, $p = 0.102$). The rate of renal disease was 22.7% ($n = 5$) in the group with mortality, while it was 7.7% ($n = 7$) in the group without mortality ($p = 0.04$). Upon analyzing the comorbidities of neoplastic disease, congestive heart failure, cerebrovascular diseases, chronic obstructive pulmonary disease, liver disease, diabetes mellitus, and hypertension, no significant difference was found between the 2 groups ($p = 0.087$, $p = 0.185$, $p = 0.644$, $p = 0.358$, $p = 1.000$, $p = 0.484$, $p = 0.545$, respectively). Of the patients in mortality group, 50.0% ($n = 11$)

Table 1. Analysis of the demographic characteristics, comorbid diseases, and laboratory parameters of patients aged 60 years and older infected with COVID-19

Age, years	
Min-max	60.0–91.0
Med	70.0
Mean ± SD	70.7±7.9
Male	73 (64.6)
Co-morbidities	
Neoplastic disease	6 (5.3)
Liver disease history	1 (0.9)
Congestive heart failure	8 (7.1)
Cerebrovascular disease	11 (9.7)
Renal disease history	12 (10.6)
Coronary artery disease	17 (15.0)
Diabetes	49 (43.4)
Hypertension	63 (55.8)
COPD	14 (12.4)
RR >30 br/min	13 (11.5)
Altered mental status	14 (12.4)
30-day mortality	
Yes	22 (19.5)
PaO_2 <60 mm Hg	15 (13.3)
Pulse (med, min-max), bpm	84.0 (54.0–124.0)
SBP (med, min-max), mm Hg	129.0 (93.0–185.0)
Saturation O_2 (med, min-max)	96.0 (70.0–100.0)
Laboratory characteristics (med, min-max)	
D-dimer, ng/mL	1,070 (150–7,684)
Ferritin, ng/mL	243.0 (20.0–2,753.0)
CRP, mg/dL	4.20 (0.20–31.0)
NLR	3.38 (0.02–46.32)
Arterial pH	7.4 (7.1–7.5)
Procalcitonin, ng/mL	0.05 (0.05–50.64)
BUN, mg/dL	18.0 (7.0–93.0)

Values are n (%) unless otherwise indicated. COPD, chronic obstructive pulmonary disease; CRP, C-reactive protein; NLR, neutrophil to lymphocyte ratio; RR, respiratory rate; SBP, systolic blood pressure.

patients had altered mental status, whereas this rate was 3.3% ($n = 3$) in the survivor group ($p = 0.000$). When 2 groups were compared, it was determined that having a respiratory rate of ≥30 breaths/min during the admission to the emergency department had an impact on the mortality ($p = 0.000$). Heart rate (pulse) was 92.3 ± 16.6 mm Hg in the mortality group, while it was 83.8 ± 11.8 mm Hg in the survivor group ($p = 0.007$). The comparison of mortality group and survivor group, regarding gender, comorbidities, respiratory rate, altered mental status, and laboratory parameters, is presented in Table 2.

When the treatments provided to the patients were examined, all patients received hydroxychloroquine treatment. Intravenous antibiotic treatment was admin-

Table 2. Comparison of the mortality group and survivor group, regarding gender, comorbidities, RR, altered mental status, and laboratory parameters based on the in-hospital mortality

	30-day mortality (no), n (%)	30-day mortality (yes), n (%)	p value
Gender			
Female	35 (38.5)	5 (22.7)	0.166
Male	56 (61.5)	17 (77.3)	
Co-morbidities			
Neoplastic disease (yes)	3 (3.3)	3 (13.6)	0.087
Liver disease history (yes)	1 (1.1)	0 (0)	1.000
Congestive heart failure (yes)	5 (5.5)	3 (13.6)	0.185
Cerebrovascular disease (yes)	7 (7.7)	4 (18.2)	0.644
Renal disease history (yes)	7 (7.7)	5 (22.7)	**0.040**
Coronary artery disease (yes)	14 (15.4)	3 (13.6)	0.837
Diabetes (yes)	38 (41.8)	11 (50.0)	0.484
COPD (yes)	10 (11.0)	4 (18.2)	0.358
Hypertension (yes)	52 (57.1)	11 (50.0)	0.545
Pleural effusion	10 (11.0)	3 (13.6)	0.727
RR >30 br/min	2 (2.2)	11 (50.0)	**0.000**
PaO2 <60 mm Hg	6 (6.6)	9 (40.9)	**0.000**
Altered mental status	3 (3.3)	11 (50.0)	**0.000**
Age (mean ± SD, med)	70.1±7.9 (69.0)	73.1±7.6 (72.5)	0.084
SBP (mean ± SD, med), mm Hg	127.0±18.4 (129.0)	126.5±20.7 (125)	0.899
Temperature (mean ± SD, med), °C	36.9±0.8 (36.7)	37.8±1.2 (37.8)	**0.002**
Pulse (mean ± SD, med), bpm	83.8±11.8 (82.0)	92.3±16.6 (89.5)	**0.007**
Saturation O2 (mean ± SD, med)	94.9±4.1 (96.0)	86.5±8.6 (88.0)	**0.000**
Laboratory characteristics (mean ± SD, med)			
Arterial pH	7.40±0.06 (7.41)	7.43±0.07 (7.44)	**0.009**
D-dimer, ng/mL	1,269±1,165 (880)	2,465±1,970 (1,665)	**0.001**
Ferritin, ng/mL	346.7±453.5 (207.0)	554.0±567.2 (437.0)	**0.006**
CRP, mg/dL	5.31±5.87 (3.40)	9.96±7.96 (8.55)	**0.002**
Procalcitonin, ng/mL	0.84±4.68 (0.05)	4.47±11.82 (0.14)	**0.000**
BUN, mg/dL	21.4±13.2 (17.0)	33.8±18.9 (26.5)	**0.000**
NLR	4.5±4.6 (3.1)	9.9±10.5 (7.2)	**0.002**

Values are n (%) unless otherwise indicated. Statistically significant values with a p value <0.05 are marked in bold. COPD, chronic obstructive pulmonary disease; CRP, C-reactive protein; NLR, neutrophil to lymphocyte ratio; RR, respiratory rate; SBP, systolic blood pressure.

istered to 93.8% of the patients, and 98.2% of them were administered with oseltamivir medication. In addition to hydroxychloroquine treatment, favipiravir was added to the treatment of 9.7% of the patients and ritonavir was added to 8% of the patients. No significant difference was determined between patients who received favipiravir treatment and those who received ritonavir treatment, regarding mortality ($p = 0.445$, $p = 0.999$, respectively). Vitamin C was added to the treatment of 10.6% of the patients and N-acetil sistein to the treatment of 18.6% of the patients. There was no significant difference in mortality between those who received vitamin C and N-acetil sistein treatment ($p = 0.245$, $p = 0.553$, respectively).

4.4% ($n = 5$) of the patients received non-invasive treatment, and no significant difference was determined between mortality groups in terms of receiving non-invasive treatment ($p = 0.250$). Mechanical ventilation was applied to 13.3% ($n = 15$) of the patients in total. 59.1% ($n = 13$) of these patients were in the mortality group ($p < 0.001$).

A total of 98 (86.7%) patients had a CURB-65 score of 0, 1, or 2. Of these, 9 (9.1%) patients died in the hospital. Fifteen patients (13.2%) had a CURB-65 score of ≥3. Of these, 13 patients (86.6%) died (Table 3). A CURB-65 score of ≥3 had a fair discriminatory ability to predict 30-day mortality with a sensitivity of 59.1%, a specificity of

Table 3. Analysis of the CURB-65 score and PSI score between the mortality group and survivor group

	30-day mortality (no)		30-day mortality (yes)		p value
	mean ± SD/n	median/%	mean ± SD/n	median/%	
CURB-65 score	1.2±0.8	1.0	2.5±1.1	3.0	0.000
CURB-65					
0	24	26.4	2	9.1	0.000
1	30	33.0	1	4.5	
2	35	38.5	6	27.3	
3	2	2.2	9	40.9	
4	0	0.0	4	18.2	
PSI	81.0±24.1	72.0	122.0±33.3	125.0	0.000
PSI class					
≤70	41	45.1	1	4.5	0.000
71–90	23	25.3	3	13.6	
91–130	22	24.2	10	45.5	
≥131	5	5.5	8	36.4	

Statistically significant values with a p value < 0.05 are marked in bold. PSI, pneumonia severity index.

Table 4. Discriminative accuracy of the D-dimer, ferritin, CRP, NLR, CURB-65, and PSI in predicting 30-day mortality

	AUC (95% CI)	p value	Cutoff	Sensitivity	Specificity	PPV	NPV
D-dimer	0.736 (0.619–0.853)	<0.001	≥1,005	86.4	53.8	31.2	94.2
Ferritin	0.689 (0.563–0.815)	<0.006	≥342	63.6	76.9	40	89.7
CRP	0.711 (0.594–0.828)	<0.002	≥2.55	90.9	47.3	29.4	95.6
NLR	0.715 (0.58–0.85)	<0.002	≥3.38	81.8	58.2	32.1	93
CURB-65	0.832 (0.717–0.948)	<0.001	Score ≥3	59.1	97.8	86.7	90.8
PSI	0.846 (0.763–0.929)	<0.001	Score ≥91	81.8	70.3	40	94.1

Statistically significant values with a p value <0.05 are marked in bold. AUC, area under curve; CI, confidence interval; NPV, negative predictive values; PPV, positive predictive values; PSI, pneumonia severity index; NLR, neutrophil to lymphocyte ratio; CRP, C-reactive protein.

97.8%, PPV of 40.4%, and NPV of 90.8% (AUC: 0.832, 95% CI, 0.717–0.948, p < 0.001) (Table 4).

The findings show that the rate of patients with PSI class III and above in the mortality group was significantly higher than the survivor group (p = 0.002). PSI score (mean ± SD value) was 122.0 ± 33.3 in the mortality group and 81.0 ± 24.1 in the survivor group (p = 0.000). Of the patients, 42 (37.2%) were in PSI class II and 26 (23.0%) were in group III, while 32 (28.3%) were in group IV and 13 (11.5%) were in group V. There was only 1 death among the patients in group II. The mortality rate was 2% in group II and 11.5% in group III, while it was 31.2% in group IV and 61.5% in group V (Table 3). The PSI class of ≥4 had a good discriminatory ability to predict 30-day mortality with a sensitivity of 81.8%, the specificity of 70.3%, PPV of 40%, and NPV of the 94.1% (AUC = 0.846, 95% CI 0.763–0.929, p < 0.001) (Table 4).

Univariate and multivariate regression analysis are presented in Table 5. It is noteworthy that NLR, which was among the assessed laboratory parameters, was found to be statistically significant for predicting mortality in both univariate and multivariate regression analyses (Table 5). When we evaluated the results of the ROC analysis, which was conducted to determine mortality, it was detected that D-dimer predicts mortality with a sensitivity of 86.4%, the specificity of 53.8%, and an NPV value of 94.2% at cutoff values ≥1,005 (AUC: 0.73, 95% CI, 0.619–0.853, p < 0.001), whereas NLR was found to predict mortality with the sensitivity of 81.8% and the specificity of

Table 5. Univariate and multivariate analysis of factors affecting mortality

	Univariate model			Multivariate model		
	OR	95% CI	*p* value	OR	95% CI	*p* value
Renal disease history	3.53	1.00–12.45	0.049			
Altered mental status	29.33	7.07–121.62	0.000	>100	21.73->100	0.009
RR >30 br/min	44.50	8.70–227.50	0.000			
Temperature, °C	2.25	1.39–3.63	0.001			
Pulse bpm	1.05	1.01–1.09	0.010			
D-dimer	1.00	1.00–1.00	0.002			
CRP	1.10	1.03–1.17	0.006			
BUN, mg/dL	1.05	1.02–1.08	0.002			
Saturation O2	0.82	0.75–0.89	0.000	0.28	0.10–0.78	0.015
PaO2 <60 mm Hg	9.81	2.99–32.13	0.000	0.00	0.00–0.48	0.035
NLR	1.11	1.03–1.21	0.006	1.51	1.11–2.39	0.044
PSI score	1.05	1.03–1.07	0.000	3.20	1.30–7.90	0.012
CURB-65 score	5.53	2.55–12.00	0.000	1.02	1.00–1.05	0.049

Statistically significant values with a *p* value <0.05 are marked in bold. CI, confidence interval; CRP, C-reactive protein; NLR, neutrophil to lymphocyte ratio; OR, odds ratio; PSI, pneumonia severity index; RR, respiratory rate.

58.2%, and an NPV value of 93% at cutoff values ≥3.38 (AUC: 0.715, 95% CI, 0.58–0.85, *p* < 0.001) (shown in Fig. 1; Table 4).

Discussion

In this study, we examined the demographic and clinical features of the patients aged 60 and over who were followed up for the treatment of COVID-19 and the factors that have an impact on mortality. The findings obtained in this study suggest that CURB-65 is as effective as PSI in predicting mortality and that NLR predicted mortality with a similar accuracy compared to D-dimer, CRP, and ferritin at a cutoff value ≥3.38. We are of the opinion that the use of CURB-65 and NLR in the overburdened setting of the emergency department for the follow-up of the prognosis of the patients with COVID-19 aged over 60 years could both hasten the management of the patients and reduce the costs.

Upon the examination of the PSI score of the patients in our study, we determined that PSI class III and the scores above were statistically significant in terms of predicting mortality. The Infectious Diseases Association of America recommends that patients with PSI class III should be treated on an outpatient basis or followed by a short hospitalization [14]. The decision of hospitalization of patients with PSI class III for the diagnosis of CAP was
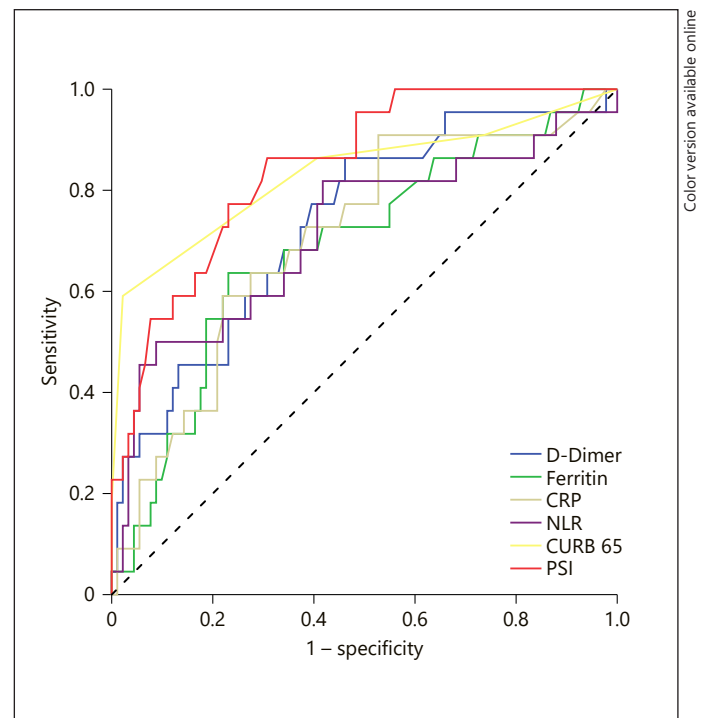

Fig. 1. ROC curve of the D-dimer, ferritin, CRP, NLR, CURB-65, and PSI in predicting 30-day mortality. CRP, C-reactive protein; NLR, neutrophil to lymphocyte ratio; PSI, pneumonia severity index; ROC, receiver operating characteristic.

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based on the clinical decision rather than objective parameters [14]. However, we consider that the mortality rate in our study increased among patients aged over 65 years who had been infected with COVID-19 with PSI class III. Hence, they should be hospitalized and followed up. Furthermore, we detected that the scores of PSI class IV and V were found to be statistically significant in predicting mortality. Because CURB-65 score ≥3, which is easily calculated with 5 parameters, predicts mortality with a specificity of 97.8% and a rate of 90.8% NPV with similar precision compared to PSI, and it is easier to calculate CURB-65 in the emergency room; with no doubt, it will facilitate the patient management of the clinician remarkably.

We determined in our study that the values of D-dimer, ferritin, AST, CRP, BUN, Cr, sodium, procalcitonin, and NLR were statistically significant in predicting mortality in the mortality group. It is well-documented that the NLR value, which can be easily calculated from the complete blood count, provides crucial information to the clinician related to the inflammation status of the patient in many illnesses [8]. We have found out that NLR predicts mortality with similar accuracy to D-dimer, CRP, and ferritin at a cutoff value ≥3.38. The potentiality of NLR, which is studied in a much shorter time than the biochemistry parameters and calculated from much more cost-efficient complete blood count parameters, to predict mortality, will enable high-risk patients to be diagnosed both early and at a much more affordable cost and be initiated with appropriate treatment.

We determined that among the 113 elderly patients infected with the novel coronavirus, men were more affected. It has been revealed in the previous studies that males were also affected by SARS-CoV and MERS-CoV infections greater compared to females [15]. The mortality rate is 19.4% in our study, and when we compare this finding with CAP mortality in the geriatric population, we notice that the mortality rates are similar to their rates – 16 and 19%, Japan and USA, respectively [16, 17]. That mortality rates are similar in the elderly population verifies the finding that characteristics of COVID-19 pneumonia are analogous to other CAP parameters.

Aging is a predisposing factor for many chronic diseases, and mortality rates due to liver disease, coronary artery disease, ischemic heart disease, cerebrovascular disease, cancer, and diabetes increase as age advances [18]. The findings obtained in this study showed that among the chronic diseases, only kidney disease was significant in predicting mortality in the mortality group. This may arise from that patients with advanced age and comorbidities pay attention to the isolation rules. Hence, the rate of comorbidity in the total patient group is low since the risk of contagion is reduced, thanks to not spending time in crowded environments as much as possible throughout the pandemic, whereas patients with CKD cannot adhere to the social isolation rules adequately due to their routine controls and the need for hemodialysis. Thus, they may face the risk of being infected. Another reason may be that renal failure, which may occur as a complication throughout the COVID-19 pandemic since the elderly patients are susceptible to multiorgan failure, may progress more severely in the patients who have a pre-existing renal dysfunction.

It is well-documented that lung infections affect cardiac functions [5] and high fever is associated with the inflammatory cytokine secretion and, hence, affects the clinical course [6]. Likewise, we found in our study that the mental status of the patients, having a respiratory rate ≥30 breaths/min, tachycardia, and high fever during admission to the emergency department, affected the mortality rate.

When we examined the complaints of the patients presented to the health care centers, cough, sputum, shortness of breath, sore throat, weakness, nausea, vomiting, and gastrointestinal complaints did not reveal any difference between the mortality groups. The mortality group was found to be more tachypnea although patients presenting with respiratory system complaints do not seem to affect mortality.

Conclusion

As a consequence, the management of the patients aged 60 and over infected with COVID-19 maintains its prominence because of the increasing mortality rates. Having an idea about the prognosis of the patients, thanks to the NLR value, which can be obtained in a short time in the emergency departments, will assist in easing the burden of the emergency departments in the fight against this pandemic and will facilitate the management of patients in a shorter time.

The limitation of our study is that it is a single-centered trial with a small number of patients. Elderly patients are undoubtedly more susceptible to infections. Mortality rates are predicted to be higher in elderly patients than in younger patients due to systemic complications, which are secondary to infections and multiorgan failure. Thus, multicentered studies would facilitate the management of geriatric patients.

Statement of Ethics

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of the University of Health Sciences, Haydarpasa Numune Training and Research Hospital (Grant No. 2020/154-2818). Since this study was a retrospective study, written informed consent was waived by the Ethics Committee of the designated hospital.

Conflict of Interest Statement

Authors declare no conflict of interest.

Author Contributions

B.G.Y., S.C., and R.G. designed this study. B.G.Y., S.C., R.G., A.U.S., I.A., and R.G.I. supervised the overall data collection process, had full access to all the data in the study, and took responsibility for the integrity of the data. B.G.Y., S.C., İ.A. and R.G.I. conducted the data analysis. B.G.Y., S.C., R.G., and A.U.S. wrote the initial draft of the article. All authors provided substantial review and feedback on the final version of the article. B.G.Y. took responsibility for the paper as a whole. All authors have read and approved the submitted manuscript. This manuscript has not been submitted or published elsewhere in whole or in part.

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