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The impact of age and underlying comorbidities on the course of COVID-19 disease; First three months data of pandemic from Antalya, Turkey

COVID-19 hastalığı seyrine yaş ve komorbid durumların etkisi; Antalya'dan pandemi ilk üç ay verileri

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ABSTRACT

Aim: This study aimed to evaluate the demographic characteristics, clinical course, treatment, and outcome data of COVID-19 patients confirmed by laboratory tests in Antalya province according to age and the presence of comorbid diseases. **Methods:** This retrospective, cross-sectional study included 438 patients diagnosed with COVID-19 as confirmed by PCR tests in Antalya between March 16th and June 15th, 2020. The study continued with 311 patients after exclusion of patients under the age of 18 as well as those with incomplete data and those receiving health care at private hospitals. The patients were divided into groups according to being under 65 years of age, with or without underlying comorbidities, with or without intensive care unit (ICU) admission, and were compared in terms of demographic characteristics, clinical course, treatment, and outcomes. **Results:** The study included 311 patients diagnosed with COVID-19 as confirmed by SARS-CoV-2 RT-PCR tests. The mean age was 47.48 ± 18.08 (min: 18, max: 94) years and 252 patients (81%) were under 65, while 52 patients (19%) were 65 and over years of age. Forty-five percent of the patients were women and 55% were men. Comorbidity, namely, hypertension (p<0.001), diabetes mellitus (p=0.010), chronic pulmonary diseases (p=0.001), and cardiovascular diseases (p<0.001) were significantly more common in geriatric patients compared to non-geriatric patients. Patients aged 65 and over, and patients with underlying comorbidities had significantly increased dyspnea, positive chest CT findings, ICU admission, mortality rates and hospitalization time compared to patients under 65 years of age and without comorbidities, respectively. Oseltamivir, favipiravir and levofloxacin were used significantly more in the treatment of geriatric patients and patients with underlying comorbidities. Being 65 and older was determined as a risk factor in univariate and multivariate models for both ICU admission and mortality. **Conclusion:** As a result, the need for intensive care and mortality rates have increased in COVID-19 patients who are older and/or have underlying comorbidities, indicating the necessity to take measures for preventing the spread of SARS-CoV-2, especially to patients who are older and/or have underlying comorbidities.

Key words: Coronavirus, geriatrics, comorbidities

ÖZET

Amaç: Bu araştırmada; Antalya ilinde laboratuvar testleri ile konfirme edilmiş COVID-19 hastalarının demografik özelliklerinin, klinik seyirlerinin, tedavi ve sonuç verilerinin yaşa ve komorbid hastalıkların varlığına göre değerlendirilmesi amaçlanmıştır. **Yöntem:** Retrospektif, tanımlayıcı çalışmaya 16.03.2020 tarihi ile 15.06.2020 tarihleri arasında Antalya ilinde revers transkritaz polimeraz zincir reaksiyonu yöntemi ile COVID-19 tanısı konan 438 hasta dahil edildi. On sekiz yaş altında olan, eksik verileri olan ve özel hastanelerden hizmet alan hastalar çalışma dışı bırakıldıktan sonra 311 hasta ile çalışmaya devam edildi. Hastalar 65 yaş altı ve 65 yaş ve üzeri, kronik hastalıkları olan ve olmayan, yoğun bakım ünitesine yatışı olan ve olmayan şeklinde gruplara ayrılarak demografik özellikleri, klinik seyirleri, tedavi ve sonuç çıktıları açısından karşılaştırıldı. **Bulgular:** Çalışmaya SARS-CoV-2 revers transkritaz polimeraz zincir reaksiyonu yöntemi ile COVID-19 tanısı alan 311 hasta dahil edildi. Yaş ortalaması 47,48±18,08 (min: 18, maks: 94) yıldı ve 252 hasta (%81) 65 yaş altında, 52 hasta (%19) 65 yaş ve üzerindeydi. Hastaların %45'i kadın, %55'i erkekti. Geriatrik hastalarda non-geriatrik hastalara göre komorbid hastalıklar; hipertansiyon (p<0,001), diabetes mellitus (p=0,010), kronik akciğer hastalıkları (p=0,001) ve kardiyovasküler hastalıklar (p<0,001) anlamlı düzeyde daha sık görülmekteydi. Altmış beş ve üzeri yaş hastalar ile komorbiditesi olan hastalarda sırasıyla <65 yaş ve komorbiditesi olmayan hastalara göre dispne, pozitif akciğer bilgisayarlı tomografi bulguları, yoğun bakım ünitesinde yatış, mortalite oranları ve hastanede yatış süreleri anlamlı düzeyde artmıştı. Geriatrik hastalar ile komorbiditesi olan hastaların tedavisinde oseltamivir, favipiravir, levofloksasin anlamlı olarak daha çok kullanılmıştı. Altmış beş ve üzeri yaşta olmak hem yoğun bakım ünitesine yatış hem de mortalite için risk faktörü olarak tespit edildi. **Sonuç:** Sonuç olarak; 65 ve üzeri yaşta ve/veya komorbiditesi olan COVID-19 hastalarında yoğun bakım ihtiyacı ve mortalite artmaktadır. SARS-CoV-2'nin özellikle bu hasta grubuna yayılmasını önlemeye yönelik tedbirlerin alınması gerektiği açıktır.

Anahtar kelimeler: Coronavirüs, geriatric hastalar, komorbiditeler

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INTRODUCTION

Spread around the world in about three months after a new beta Coronavirus was announced to have been detected from a patient's throat sample in Wuhan, China in December 2019, the virus was named by the World Health Organization (WHO) as a novel coronavirus-19 (2019-novel coronavirus disease = COVID-19), and regarded as a pandemic.[1-4] The first case was detected in Antalya on March 16, 2020 though the virus was first isolated in Turkey on March 11, 2020.

COVID-19 is mainly transmitted by droplets, respiratory secretions, and direct contact.[3,5] Although symptoms occur on an average of 5-6 days after a person is infected with the COVID-19 virus, the incubation period generally varies from 2 to 14 days.[3,6] Fever, dry cough, and fatigue are the most common symptoms, while sore throat, diarrhea, conjunctivitis, headache, anosmia, and ageusia are less common symptoms.[5,7] It is recommended that the SARS-CoV-2 (2019-nCoV) viral RNA should be detected in nasopharynx and/or oropharynx swabs by real-time reverse-transcriptase polymerase chain reaction (RT-PCR) method in addition to the chest computed tomographic (CT) scans in symptomatic patients.[8-11]

Since the disease has no specific treatment yet, remdesivir, favipiravir, lopinavir-ritonavir, chloroquine/hydroxychloroquine, ivermectin, tocilizumab, and vitamin C are commonly used agents along with the approach of using old antiviral drugs and those approved for other viral infections.[12] With the publication of the 'Science Advisory Board Clinical Guideline for Care of Adult Patients with COVID-19 (SARS-CoV-2 infection) dated 31.07.2020, it is recommended that 5-day hydroxychloroquine and/or favipiravir therapy should be administered in the treatment of all adult patients ranging from being asymptomatic with definite COVID-19 to those with severe pneumonia and possible/definite COVID-19.[13]

WHO reported that most people infected with the COVID-19 virus will experience moderate respiratory illness and may recover without the need for special treatment/hospitalization.[7] The virus can, however, be quite fatal in older people, especially in those with comorbidity [especially hypertension (HT), cardiovascular disease (CVD), diabetes mellitus (DM), chronic pulmonary diseases and types of cancer], or those with immune dysfunction, due to the onset of symptoms of pneumonia such as high fever, dry cough and shortness of breath/respiratory distress in those.[14-19]

This study aimed to evaluate the demographic characteristics, clinical course, treatment and outcome data of COVID-19 patients confirmed by laboratory tests in Antalya province according to age and the presence of comorbid diseases.

MATERIAL AND METHODS

Study Groups

This retrospective and cross-sectional study included 438 patients diagnosed with COVID-19 by SARS-CoV-2 RT-PCR tests in Antalya between March 16th and June 15th, 2020. The study continued with 311 patients after excluding patients under the age of 18 as well as those who had incomplete data and who received health care at private hospitals. Patients under 65 years of age and 65 and over were divided into groups according to being with or without chronic disease [HT, DM, chronic pulmonary diseases, CVD, chronic renal failure and malignant diseases] and being treated with and without intensive care unit (ICU) admission, and were then compared in terms of study parameters.

Data Collection

Demographic characteristics, underlying comorbidities, symptoms, clinical characteristics, chest CT scans, treatment and outcome data of the patients in the study group were obtained from electronic medical records, and patient files prepared by the contact tracing teams were reviewed by physicians.

Laboratory Confirmation

Diagnosis of COVID-19 was made using RT-PCR assay of a nasopharyngeal swab or sputum.

Statistical Analysis

Statistical analysis was made using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, NY). The normality assumptions were controlled by the Shapiro–Wilk test. Descriptive analyses were presented using mean±SD (range), median (range), or n(%), where appropriate. Categorical data were analyzed by Pearson chi-square and Fisher's exact test. Mann–Whitney U test and Student's t test were used for analysis of non-normally and normally distributed numerical data, respectively. Univariate and multivariate logistic regression analysis was used to determine independent risk factors associated with mortality and ICU admission. The variables which showed significant association with mortality and ICU admission in the univariate analyses were further tested in the multivariate models using backward

selection. Odds ratio (OR) with corresponding 95% confidence interval (95% CIs) was reported. A p-value of less than 0.05 was considered statistically significant.

Ethics Statement

Prior to the study, approval was obtained from the Ministry of Health COVID-19 Scientific Research Platform and the Clinical Research Ethics Committee of the University of Health Sciences, Antalya Training and Research Hospital. The study was conducted in accordance with the Helsinki Declaration.

RESULTS

The study included 311 patients diagnosed with COVID-19 using the SARS-CoV-2 RT-PCR tests. The mean age was 47.48 ± 18.08 (min: 18, max: 94) years, and 252 patients (81%) were under 65 years old, whereas 52 patients (19%) were 65 and over years old. Of the patients, 45% were female, while 55% were male. Comorbidity such as HT (p<0.001), DM (p=0.010), chronic lung diseases (p=0.001), and CVD (p<0.001) were observed significantly more frequently in geriatric patients compared to non-geriatric patients (Table 1).

Table 1 presented the classification of the patients into two groups as geriatric and non-geriatric, followed by their comparison. Dyspnea, positive chest CT findings, ICU admission, mortality rates and length of hospital stay significantly increased in patients aged 65 and over (all p<0.001). Oseltamivir, favipiravir, levofloxacin, moxifloxacin, and ceftriaxone were significantly more preferred in the treatment of patients aged 65 and over (Table 1).

Table 1. Comparison of demographic and clinical characteristics of COVID-19 patients according to age.

Variables	**<65 years** (n=252) Count (%)	**≥65 years** (n=59) Count (%)	**p value**
Gender (male)	136(54)	35(59.3)	0.457[1]
Underlying comorbidities	58(23.1)	45(76.3)	**<0.001[1]**
Hypertension	24(9.6)	32(54.2)	**<0.001[1]**
Diabetes mellitus	19(7.6)	11(18.6)	**0.010[1]**
Chronic pulmonary diseases	18(7.2)	13(22.0)	**0.001[1]**
Cardiovascular disease	5(2.0)	9(15.3)	**<0.001[2]**
Chronic renal failure	1(0.4)	1(1.7)	0.345[2]
Malignant diseases	8(3.2)	5(8.5)	0.079[2]
Symptoms			
Fever	111(44.0)	29(49.2)	0.478[1]
Cough	128(50.8)	31(52.5)	0.809[1]
Dyspnea	39(15.5)	27(45.8)	**<0.001[1]**
Fatigue	73(29.0)	16(27.1)	0.777[1]
Diarrhea	10(4.0)	1(1.7)	0.697[2]
Anosmia	14(5.6)	1(1.7)	0.319[2]
Ageusia	9(3.6)	3(5.1)	0.705[2]
Positive chest CT findings	100(39.7)	50(84.7)	**<0.001**
Medicines used in treatment			
Hydroxychloroquine	215(85.3)	46(78.0)	0.166[1]
Oseltamivir	125(49.6)	44(74.6)	**0.001[1]**
Favipravir	23(9.1)	17(28.8)	**<0.001[1]**
Lopinavir/Ritonavir	4(1.6)	3(5.1)	0.129[2]
Levofloxacin	31(12.3)	17(28.8)	**0.002[1]**
Moxifloxacin	28(11.1)	13(22.0)	**0.026[1]**
Clarithromycin	12(4.8)	4(6.8)	0.516[2]
Ceftriaxone	13(5.2)	9(15.3)	**0.019[2]**
Azithromycin	99(39.3)	23(39.0)	0.966[1]
Place of treatment			
Home	41(16.3)[a]	1(1.7)[b]	
Ward only	198(78.6)[a]	37(62.7)[b]	**<0.001[1]**
ICU only	2(0.8)[a]	9(15.3)[b]	
Ward + ICU	11(4.4)[a]	12(20.3)[b]	
ICU admission	13(5.2)	21(35.6)	**<0.001[1]**
Mortality	2(0.8)	12(20.3)	**<0.001[2]**

Age (years)mean±SD(min-max)	40.9±12.4(18-64)	75.8±8.6(65-94)	**<0.001[3]**
Length of hospital stay (days) median (min-max)	7(1-29)	10.5(1-54)	**0.001[4]**
Ward only	7(1-27)	9(1-20)	0.088[4]
ICU only	12(9-15)	15(4-31)	0.436[4]
Ward + ICU	21(10-29)	15.5(7-54)	0.211[4]

Data are presented as n(%) or mean±SD (min-max) values. [1]Pearson chi-square test, [2]Fisher's exact test, [3]Student's t test, [4]Mann-Whitney-U test.
CT = Computerized tomography, ICU = Intensive care unit

Table 2. Comparison of COVID-19 patients with and without comorbidity.

Variables	**Without comorbidity** (n=207) Count (%)	**With comorbidity** (n=103) Count(%)	**p value**
Gender (male)	118(57)	52(50.5)	0.277[1]
Symptoms			
Fever	95(45.9)	44(42.7)	0.596[1]
Cough	97(46.9)	61(59.2)	**0.040[1]**
Dyspnea	30(14.5)	35(34)	**<0.001[1]**
Fatigue	61(29.5)	27(26.2)	0.549[1]
Diarrhea	8(3.9)	3(2.9)	0.999[2]
Anosmia	13(6.3)	2(1.9)	0.157[2]
Ageusia	8(3.9)	4(3.9)	0.999[2]
Positive chest CT findings	77(37.2)	72(69.9)	**<0.001[1]**
Medicines used in treatment			
Hydroxychloroquine	175(84.5)	85(82.5)	0.649[1]
Oseltamivir	100(48.3)	68(66.0)	**0.003[1]**
Favipiravir	14(6.8)	25(24.3)	**<0.001[1]**
Lopinavir / Ritonavir	3(1.4)	4(3.9)	0.226[2]
Levofloxacin	19(9.2)	28(27.2)	**<0.001[1]**
Moxifloxacin	26(12.6)	15(14.6)	0.624[1]
Clarithromycin	9(4.3)	7(6.8)	0.359[1]
Ceftriaxone	11(5.3)	11(10.7)	0.083[1]
Azithromycin	79(38.2)	43(41.7)	0.543[1]
Place of treatment			
Home	36(17.4)[a]	6(5.8)[b]	**<0.001[1]**
Ward only	161(77.8)[a]	74(71.8)[a]	
ICU only	2(1.0)[a]	8(7.8)[b]	
Ward + ICU	8(3.9)[a]	15(14.6)[b]	
ICU admission	10(4.8)	23(22.3)	**<0.001[1]**
Mortality	3(1.4)	11(10.7)	**0.001[2]**
Age (years) mean±SD(min-max)	40.4±14.9(18-94)	61.9±15.3(23-92)	**<0.001[3]**
Length of hospital stay (days) median(min-max)	7(1-29)	9(1-54)	**0.019[4]**
Ward only	7(1-27)	8(1-22)	0.506[4]
ICU only	10.5(4-17)	15(9-31)	0.533[4]
Ward + ICU	18.5(10-29)	19(7-54)	0.925[4]

Data are presented as n(%), mean ±SD (min-max) or median (min-max) values. [1]Pearson chi-square test, [2]Fisher's exact test, [3]Student's t test, [4]Mann-whitney U test.
CT = Computerized tomography, ICU = Intensive care unit

Table 2 presented the comparison between the patients with and without comorbidity. Cough (p=0.040) and dyspnea (p<0.001) were the most common symptoms in patients with comorbidity. Findings of pulmonary involvement (p<0.001) were more frequently detected on CT imaging in patients with comorbidity, for whom oseltamivir, favipiravir, and levofloxacin were significantly more preferred as the treatment choice. ICU admission (p<0.001) and mortality (p=0.001) rates also significantly increased in patients with comorbidities. One of three patients, who died of COVID-19 without any chronic disease, was a Hepatitis B carrier while the other had Alzheimer's disease and the third one was a substance addict.

Table 3 showed the comparison between the patients with and without ICU admission. Dyspnea, positive signs on the chest CT, underlying comorbidities, mortality rate, and hospital stay significantly increased in patients treated in ICU (all p<0.001). In addition, the administration of oseltamivir, favipiravir, lopinavir/ritonavir, and levofloxacin was significantly higher in patients treated in ICU.

Table 3. Comparison of COVID-19 patients with and without ICU admission.

Variables	**No ICU admission** (n=277) Count (%)	**ICU admission** (n=34) Count (%)	**p value**
Gender (male)	149(53.8)	22(64.7)	0.227[1]
Symptoms			
Fever	121(43.7)	19(55.9)	0.177[1]
Cough	140(50.5)	19(55.9)	0.557[1]
Dyspnea	42(15.2)	24(70.6)	**<0.001**[1]
Fatigue	78(28.2)	11(32.4)	0.610[1]
Diarrhea	9(3.2)	2(5.9)	0.343[2]
Anosmia	14(5.1)	1(2.9)	0.999[2]
Ageusia	11(4.0)	1(2.9)	0.999[2]
Positive chest CT findings	122(44.0)	28(82.4)	**<0.001**[1]
Comorbidity	80(28.9)	23(69.7)	**<0.001**[1]
Hypertension	44(15.9)	12(36.4)	**0.004**[1]
Diabetes mellitus	25(9.0)	5(15.2)	0.343[2]
Chronic lung diseases	22(7.9)	9(27.3)	**0.002**[2]
Cardiovascular disease	10(3.6)	4(12.1)	**0.049**[2]
Chronic renal failure	1(0.4)	1(3.0)	0.202[2]
Malignant diseases	8(2.9)	5(15.2)	**0.007**[2]
Medicines used in treatment			
Hydroxychloroquine	235(84.8)	26(76.5)	0.210[1]
Oseltamivir	145(52.3)	24(70.6)	**0.044**[1]
Favipiravir	17(6.1)	23(67.6)	**<0.001**[2]
Lopinavir / Ritonavir	3(1.1)	4(11.8)	**0.003**[2]
Levofloxacin	37(13.4)	11(32.4)	**0.004**[1]
Moxifloxacin	37(13.4)	4(11.8)	0.999[2]
Clarithromycin	13(4.7)	3(8.8)	0.398[2]
Ceftriaxone	18(6.5)	4(11.8)	0.280[2]
Azithromycin	109(39.4)	13(38.2)	0.900[1]
Mortality	2(0.7)	12(35.3)	**<0.001**[2]
Age (years) mean±SD(min-max)	45.1±17 (18-92)	67.2±14 (39-94)	**<0.001**[1]
Length of hospital stay (days) median (min-max)	7(1-27)	16(4-54)	**<0.001**[4]

Data are presented as n (%), mean ± SD (min-max) or median (min-max) values. [1]Pearson chi-square test, [2]Fisher's exact test, [3]Student's t test, [4]Mann-Whitney U test.
CT = Computerized tomography, ICU=Intensive care unit

Table 4. Factors affecting ICU admission.

Variables	Univariate		Multivariate	
	OR (95% CI)	p	OR (95% CI)	p
Age ≥65	10.16(4.696-21.981)	**<0.001**	5.520(2.294-13.283)	**<0.001**
Hypertension	3.026(1.389-6.594)	**0.005**	-	-
Chronic lung diseases	4.347(1.801-10.492)	**0.001**	-	-
Cardiovascular diseases	3.683(1.086-12.489)	**0.036**	-	-
Malignant diseases	6.004(1.839-19.603)	**0.003**	-	-
Positive chest CT findings	5.929(2.379-14.775)	**<0.001**	2.452(0.871-6.908)	0.090
Dyspnea	13.429(5.989-30.11)	**<0.001**	8.049(3.387-19.129)	**<0.001**

ICU = Intensive care unit, CT = Computerized tomography

Table 5. Factors affecting mortality.

Variables	Univariate		Multivariate	
	OR (95% CI)	p	OR (95% CI)	p
Age ≥65	31.915(6.917-147.246)	**<0.001**	43.120(4.926-377.468)	**0.001**
Hypertension	4.234(1.365-13.134)	**0.012**	-	-
Chronic lung diseases	4.444(1.283-15.396)	**0.019**	-	-
Malignant diseases	14.222(3.68-54.96)	**<0.001**	10.893(1.519-78.105)	**0.017**
Positive chest CT findings	15.182(1.961-117.548)	**0.009**	-	-
Dyspnea	16.133(4.354-59.778)	**<0.001**	5.083(1.173-22.019)	**0.030**

CT = Computerized tomography

Table 4 showed the evaluation of the factors affecting admission to the intensive care unit through univariate and multivariate logistic regression analysis. In univariate logistic regression analysis, age≥65 (OR: 10.16; %95 CI: 4.696-21.981; p<0.001), HT (OR: 3.026; %95 CI: 1.389-6.594; p=0.005), chronic lung diseases (OR: 4.347; %95 CI: 1.801-10.492; p=0.001), CVD (OR: 3.683; %95 CI: 1.086-12.489; p=0.036), malignant diseases (OR: 6.004; %95 CI: 1.839-19.603; p=0.003), positive chest CT findings (OR: 5.929; %95 CI: 2.379-14.775; p<0.001), and dyspnea (OR: 13.429; %95 CI: 5.989-30.11; p<0.001) were positively associated with ICU admission. In multivariate model, age≥65 (OR: 5.520; %95 CI: 2.294-13.283; p<0.001) and dyspnea (OR: 8.049; %95 CI: 3.387-19.129; p<0.001) were identified as significant risk factors for ICU admission.

Table 5 presented the factors affecting mortality analyzed with univariate and multivariate logistic regression models. In univariate logistic regression analysis, age≥65 (OR: 31.915; %95 CI: 6.917-147.246; p<0.001), HT (OR: 4.234; %95 CI: 1.365-13.134; p=0.012), chronic lung diseases (OR: 4.444; %95 CI: 1.283-15.396; p=0.019), malignant diseases (OR: 14.222; %95 CI: 3.68-54.96; p<0.001), positive chest CT findings (OR: 15.182; %95 CI: 1.961-117.548; p<0.001), and dyspnea (OR: 16.133; %95 CI: 4.354-59.778; p<0.001) were significantly associated with mortality. In multivariate model, age≥65 (OR: 43.120; %95 CI: 4.926-377.468; p=0.001), malignant diseases (OR: 10.893; %95 CI: 1.519-78.105; p=0.017), and dyspnea (OR: 5.083; %95 CI: 1.173-22.019; p=0.030) were identified as significant risk factors for mortality.

DISCUSSION

This study has revealed that dyspnea is a more common symptom and pulmonary involvement significantly increased in chest CT in geriatric patients and patients with underlying comorbidities diagnosed with COVID-19. Oseltamivir, favipiravir, and levofloxacin are used more in the treatment of these patients. It has also been noted that the hospitalization time and the rate of

admission in ICU increase significantly compared to those of non-geriatric patients and patients without underlying comorbidities. Being 65 years of age or older is an independent risk factor that increases both ICU admission and mortality.

The results of our study support the literature in general. In a study evaluating 3032 deaths associated with COVID-19 in Italy, Palmieri et al. revealed that the most common symptoms were fever and dyspnea regardless of age.[17] In another study conducted in China, patients diagnosed with COVID-19 were divided into three groups: 50-64 years, 65-79 years and ≥80 years, and the most common symptoms in geriatric patients were reported as fever, cough, dyspnea, and fatigue, respectively.[20] In our study, although there was a small change in the ranking in patients who were 65 and older, the most common symptoms were cough (52.5%), fever (49.2%), dyspnea (45.8%), and fatigue (27.1%), respectively. On the other hand, the two most common symptoms in all age groups in our study were again cough and fever, respectively.

In their research with 1482 patients hospitalized with the diagnosis of COVID-19, Garg et al. concluded that the hospitalization rate was the highest in patients over 65 years old and that 54.4% of those hospitalized were male, 89.3% had one or more underlying condition, the most common comorbidity included HT (49.7%), obesity (48.3%), chronic lung disease (34.6%), DM (28.3%), and CVD (27.8%).[21] In a study by Lee et al. conducted in Korea with 98 patients over 65 years of age, the authors found that 74.5% of the patients had underlying conditions, the most common of which were reported as HT (52%), DM (27%), CVD (16.3%), chronic neurologic disease (14.3%), and malignancy (11.2%).[18] Similar to other studies, underlying conditions were more often observed in the geriatric patient group in our study, and the most common comorbidities in this age group were HT (54.2%), chronic lung disease (22%), DM (18.6%), and CVD (15.3%).

In a study conducted in Wuhan, 98.2% of patients over the age of 65 had bilateral distribution in chest CT and pleural effusion in 23.6%.[16] Likewise, our study found that 84.7% of geriatric patients and 69.9% of patients with underlying conditions presented with typical chest CT findings, which increased statistically significantly compared to patients under 65 years of age and those without comorbid diseases, respectively (all $p<0.001$).

In their study conducted with only geriatric patients, Lee et al. reported that 76.5% of the patients were given lopinavir/ritonavir or darunavir/ritonavir, whereas 60.2% were given hydroxychloroquine.[18] In Turkey, Sümer et al. evaluated the COVID-19 patients they followed in a medical faculty hospital, reporting that the most preferred combination for treatment was hydroxychloroquine + oseltamivir + azithromycin.[22] Similar to Sümer's study, we found that hydroxychloroquine (78%), oseltamivir (74.6%), azithromycin (39%) and favipiravir (28.8%) were the most preferred choice of treatment in both geriatric and non-geriatric patients. The use of oseltamivir and azithromycin seems to have surpassed the use of favipiravir, since the data of both our study and the study of Sümer et al. were dated before the COVID-19 (SARS-CoV-2) Infection Scientific Advisory Board Guideline was published for the treatment of adult patients with COVID-19 infection on 02.08.2020.

In a review/meta-analysis evaluating 14 retrospective studies, it was reported that the presence of underlying comorbidities (HT, CVD, DM, COPD, and cancer), as well as being male and being ≥65 years of age, increased mortality.[23] In another study, DM, chronic lung disease and chronic neurologic disease was found to be significantly associated with mortality.[18] Our study concluded that being over 65 years of age, having underlying comorbidities (HT, chronic lung diseases and malignant diseases), presence of dyspnea, and positive chest CT findings such as ground-glass opacity/patchy shadows were significantly associated with mortality.

The weekly report of the US Centers for Disease Control and Prevention (CDC) COVID-19 Response Team stated that 53% of the patients were admitted to the ICU in the early period of the pandemic, and 80% of the patients who died were ≥65 years old.[24] In a study conducted in Italy, where the pandemic was severe, Palmieri et al. reported that 66.6% of COVID-19 related deaths were men, and 87.9% were patients over 65 years old.[17] In our study, 60.6% of COVID-19 related ICU admissions included geriatric patients besides 78.6% of deaths being male patients and 85.7% being geriatric patients. In a study with 98 geriatric patients diagnosed with COVID-19, Lee et al. reported that 20 (20.4%) of the patients died during follow-up.[18] Similarly, 20.3% of geriatric patients also died in our study. The fact that the mortality rates of geriatric patients in our study are so close with Lee's study suggests that antiviral agents containing different active substances used in the treatment of patients in our study may not have superiority to each other. In the same study, the median time to death after admission was found as 8 (5-11) days,[18] whereas in Palmieri's study, this period was 6 (3-10) days,[17] and it was calculated as 8 (1-54) days in our study similar to Lee's.

In this study, we did not group our patients as those hospitalized and non-hospitalized, because the data of the study belong to the early pandemic period in our city when the number of cases was relatively low (first three months). In our city, almost all COVID-19 patients were hospitalized and/or treated during this period. This can be indicated as the limitation of our research. Another limitation of our study may be the low number of patients in this age group, thanks to the measures introduced for patients over 65 years of age in our country since the first days of the pandemic (on the other hand, these measures are a very important decision taken by The Ministry of Health and the National Science Committee for the protection of geriatric patients / public health). The fact that no similar study was found in the literature on COVID-19 patients diagnosed in all public hospitals in Antalya province to show the first three months of the pandemic is the strength of our study. In addition, this study can be an important data source in terms of making a comparison with the data to be obtained, especially after the dynamism in the tourism sector intensifies after normalization.

As a result, the need for intensive care and the rate of mortality are increasing in COVID-19 patients who are older and/or those with underlying comorbidities. Despite the ongoing debates about how long the immunity against SARS-CoV-2 will last and whether infected people will become re-infected after a while, as Eraksoy also stated,[25] necessary precautions must be taken, especially those regarding vaccination, in order to prevent the spread of the virus to older patients and those with comorbidity.

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