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Behiye Deniz Kosovalı,
Gül Meral Kocabeyoğlu,
Nevzat Mehmet Mutlu,
Tülay Tuncer Peker,
Özlem Balkız Soyal,
Işıl Özkoçak Turan

Results of 1430 Patients Admitted to Intensive Care Unit with Suspicion of COVID-19 in Turkey's Capital-Ankara: A Single Center Study

Türkiye'nin Başkentinde -Ankara- COVID-19 şüphesiyle Yoğun Bakıma Kabul Edilen 1430 Hastanın Sonuçları: Tek Merkezli Çalışma

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Behiye Deniz Kosovalı, Gül Meral Kocabeyoğlu, Nevzat Mehmet Mutlu, Işıl Özkoçak Turan
Ankara City Hospital, Clinic of Critical Care, Ankara, Turkey

Tülay Tuncer Peker,
University of Health Sciences Turkey, Gülhane Training and Research Hospital, Clinic of Critical Care, Ankara, Turkey

Özlem Balkız Soyal
Ankara City Hospital, Clinic of Anesthesiology and Reanimation, Ankara, Turkey

Behiye Deniz Kosovalı MD (✉),
Ankara City Hospital, Clinic of Critical Care, Ankara, Turkey

E-mail : kosovalideniz@yahoo.com
Phone : +90 312 552 60 00

ABSTRACT *Objective:* The patients admitted to COVID-19 ICUs with the suspicion of COVID-19 in the first four months of the pandemic were evaluated both in diagnostics and according to periods of the pandemic.

Materials and Methods: The data of 1430 patients admitted to the COVID-19 ICUs were recorded with the same algorithm in a single-center retrospectively. Patients were classified as COVID-19 and non-COVID-19 patients according to PCR results, radiological and clinical findings. Also, COVID-19 patients were compared as dying and surviving. Additionally, the data of patients admitted to COVID-19 ICUs during the onset of the pandemic and during the normalization period were also compared.

Results: Of 1430 patients, 630 were included in the COVID-19 group and 800 in the non-COVID-19 group. While there was a significant difference in the mean age of the groups, there was no difference between the genders (p=0.001, p=0.262 respectively). The age in the COVID-19 and deceased group was higher than that in the survivors (p<0.001). The most common presenting symptom was dyspnea (51.2%), while hypertension's most common comorbidity (51.2%). During the normalization period, the rate of patients admitted to the ICU with the diagnosis of COVID-19 and the mortality rates in the ICU was higher.

Conclusion: The initial period of the pandemic was spent understanding COVID-19, which entered our lives as a mystery at the same time. It was a guiding period for us to treat patients more effectively while protecting the community and healthcare professionals.

Keywords: COVID-19, intensive care unit, mechanical ventilator, high flow nasal oxygen, mortalite

ÖZ *Amaç:* Pandeminin ilk dört aylık döneminde COVID-19 şüphesiyle, COVID-19 YBÜ'lerine kabul edilen hastalar tanılarına ve dönemlere göre karşılaştırıldı.

Gereç ve Yöntem: Tek merkezde aynı algoritma ile COVID-19 YBÜ'ne kabul edilen 1430 hasta verisi retrospektif olarak kaydedildi. Hastalar; PCR sonucu, radyolojik ve klinik bulgulara göre COVID-19 ve nonCOVID-19 hastalar olarak sınıflandırıldı. Ayrıca COVID-19 hastalar ölen ve yaşayan olarakta karşılaştırıldı. Bunun yanında, pandeminin başlangıcı ve normalleşme döneminde COVID-19 YBÜ'lerine kabul edilen hastaların verileri de karşılaştırıldı.

Bulgular: Çalışmaya alınan 1430 hastanın 630'u COVID-19, 800'ü non-COVID-19 gruptaydı. Yaş ortalamalarında anlamlı farklılık bulunurken, cinsiyetler arasında farklılık yoktu (p=0.001, p=0.262). COVID-19 ölen grubun yaş ortalaması yaşayan gruptan daha yüksekti (p<0.001). En sık başvuru semptomu dispne (51.2%), en sık eşlik eden komorbidite HT (51.2%) idi. Normalleşme döneminde 'COVID-19' tanısı ile yoğun bakıma kabul edilen hasta oranı ve yoğun bakımda mortalite oranı daha fazlaydı.

Sonuç: Pandemi başlangıç dönemi hayatımıza bir bilinmez olarak giren COVID-19'u anlayabilmekle geçti ve aynı zamanda toplumu ve sağlık çalışanlarını koruyarak hastaları daha etkin bir şekilde tedavi etmemiz için yol gösterici bir period oldu.

Anahtar Kelimeler: Yoğun bakım, hasta pozisyonu, kardiyak debi, hemodinamik monitörizasyon, hava yolu direnci

Introduction

A pandemic is defined as an epidemic occurring worldwide, or over a vast area, crossing international boundaries and usually affecting many people (1). The coronavirus disease-2019 (COVID-19) pandemic, which first appeared in China in December 2019 and is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), has impacted all over the world. In Turkey, the first case was detected on March 11, 2020 (2).

The high rate of transmission of the disease caused an increase in the number of cases. Accordingly, the number of patients admitted to the hospital, the frequency of hospitalization, and the need for intensive care (3). COVID-19 can be asymptomatic or with symptoms similar to upper respiratory tract infection, and it can also cause symptoms that progress to respiratory failure and acute respiratory distress syndrome (ARDS) (4). Therefore, we now know that patients need supportive treatments that require nasal oxygen, high flow nasal oxygen (HFO), mechanical ventilators (MV), and even extracorporeal life support systems (5,6). One of the critical issues to be planned during the pandemic is determining areas such as the service and intensive care units where COVID-19 patients will be treated and the teams to work there. As recommended in the World Health Organization (WHO) guide, in the COVID-19 pandemic, intensive care teams are established under the leadership of an experienced intensive care specialist in intensive care units. These teams consist of ICU specialists and other specialists and personnel, especially health workers who have previous intensive care experience or will specialize in this field (7).

The hospital in which the study took place in a large hospital located in the capital city of Turkey, Ankara, with interconnected floors, six hospital buildings connected by the main mass in the middle, and each one of six hospitals has varying numbers of general and branch intensive care units (ICUs). During the pandemic, arrangements were made in inpatient services and intensive care units to treat patients diagnosed with COVID-19. Many patients from Ankara and surrounding provinces were hospitalized and admitted to the services and ICUs.

In the literature, we could not find any study comparing the patients diagnosis with COVID-19 and non-COVID-19 patients admitted to a single-center and pandemic intensive care unit during the pandemic period.

This study aims to evaluate and compare the demographic and clinical characteristics, intensive care and hospitalization times, intensive care support treatments, and mortality rates of patients admitted to COVID-19 ICUs with the suspicion of COVID-19 in the first four months of the pandemic, both according to diagnosis (COVID-19 and non-COVID-19), and in terms of pandemic periods (onset of pandemic and normalization period).

Materials and Methods

After the ethics committee's approval (Ethics committee no: E1-20-527), all patients aged 18 years and older who were followed up in 14 COVID-19 ICUs between 19 March and 10 July 2020 were included in the study. Patient data were scanned and recorded retrospectively via the Hospital Information Management System.

The hospital where the study was conducted is a large health complex with many general and branch ICUs. All ICUs have 16 isolated and negative pressure rooms containing one bed each. On March 19th 2020, patients diagnosed with COVID-19 began to be admitted to the neurology-orthopedics hospital of the city hospital, which had the highest number of ICUs and beds (9 ICUs, 144 beds) the pandemic period. Then, in April 2020, COVID-19 patients were admitted to the general hospital with 80 beds and 5 ICUs. As of June 1st 2020, when the number of cases decreased and the normalization process began, only three general ICUs in the neurology-orthopedics hospital continued to accept COVID-19 patients while non-COVID-19 patients were hospitalized in the remaining 11 ICUs. Thus, patients with suspected or diagnosed COVID-19 were admitted to 14 ICUs with a total of 224 beds between March 19th, 2020 and May 31st, 2020, while they were admitted to 3 ICUs with 48 beds between June 1st, 2020 and July 10th, 2020. All ICUs had at least one intensive care specialist, and the nurse-patient ratio was 1:2.

The presence of SARS-CoV-2 was confirmed by the polymerase chain reaction (PCR) method with oropharynx and nasopharynx swab or endotracheal aspiration samples. PCR results were classified as positive, negative, and patients with no PCR samples. The computed tomography (CT) findings of the thorax before admission to the ICU were classified as COVID-19 compatible, suspicious and incompatible. In the diagnostic classification, patients with positive PCR results and patients with negative PCR results but whose clinical and radiological findings were compatible with COVID-19 in the CT were considered as COVID-19. Other patients were accepted as non-COVID-19. After all patients with suspected COVID-19 were admitted to the ICU, at least two PCR tests were taken from all patients at 24-hour intervals in the algorithm applied to decide which unit the patients would be transferred to during the transport phase. Patients with at least one positive PCR result who no longer needed intensive care were transferred to COVID-19 services. Patients with negative results for two consecutive PCRs were re-evaluated with the infectious diseases doctor. Those who had a continuing need for intensive care were transferred to the non-COVID-19 ICU. Those who no longer needed intensive care were transferred to the non-COVID-19 service. Patients who were accepted as COVID-19 were also divided into two groups: surviving (COVID-19 alive) and deceased (COVID-19 dead).

Age, gender, symptom, comorbidity, Acute Physiology, and Chronic Health Evaluation II (APACHE-II) scores of the patients in the first 24 hours in the ICU were recorded. Nasal/mask oxygen, high flow oxygen (HFO), noninvasive mechanical ventilation (NIMV), invasive mechanical ventilation (IMV), hemodiafiltration (HDF) or continuous renal replacement therapy (CRRT), extracorporeal membrane oxygenator (ECMO), vasopressor/inotrope requirements and the length of stay in the ICU were determined from the records.

The unit where the patients were transferred to the ICU from (emergency department, COVID-19 service, non-COVID-19 service, another hospital), the length of stay in the service or intensive care unit before the intensive care unit, the length of stay in the COVID-19 ICU, where they are transferred from the ICU (COVID -19 service, non-COVID-19 service, non-COVID-19 ICU, home, external center, exitus), duration of hospitalization in the COVID-19 and non-COVID-19 service or non-COVID-19 ICU where they were transferred from the ICU, total length of ICU and hospital stay, ICU and hospital mortality rates were recorded.

The number of patients hospitalized in ICUs was recorded daily. In addition, patients admitted to the ICU were classified according to 2 different periods: the onset of the pandemic (March 19th-May 31st, 2020) and the period when normalization began (June 1st, 2020- July 10th, 2020).

Statistical Analysis

Statistical analysis of the data obtained in the study was performed using the SPSS for windows 26.0 Statistical Package Program. Continuous variables were expressed as mean±SD. After evaluating the suitability of numerical data with normal distribution with Kolmogorov-Smirnov test, Student's-T test was used to compare numerical data with normal distribution. The Mann-Whitney U test was used to compare the numerical data that did not fit the normal distribution. Categorical data were given as numbers and percentages. Chi-Square test was used to compare categorical data. $P<0.05$ was considered significant.

Results

When the data of 1430 patients who applied to 14 ICUs with the suspicion of COVID-19 between March 19th, 2020 and July 10th, 2020 were analyzed retrospectively, number of patients admitted to the ICU was highest on April 28th, 2020 (30 patients), while on June 2nd, 2020, no patient was admitted to the ICU (Figure 1). The mean age of all patients was 71.26, the number of males was 782 (54.7%), and the mean APACHE-II score was 17.42. Dyspnea (49.8%) was the most common symptom and hypertension (48.6%) was the most common comorbidity. Of all patients, 45.5% had mild clinical symptoms and 74.3% needed nasal/mask oxygen (Table 1). PCR results were positive in 308 (21.5%) of 1430 patients. According to thoracic CT findings, 554 (38.8%) patients were compatible with COVID-19, 298 (20.8%) patients were incompatible with COVID-19, and 578 (40.4%) patients were suspected of COVID-19. Six hundred thirty patients constituted the COVID-19 group, with 308 patients with positive PCR results and 322 (22.5%) patients with negative PCR results but consistent with COVID-19 on thorax CT findings. A total of 800 patients with negative PCR tests and those with inconsistent or suspicious thoracic CT findings whose clinical findings were evaluated together with infectious diseases doctors were included in the non-COVID-19 group. The highest number of hospitalizations (203 patients) in the ICU with suspected COVID-19 were between 21st-30th April 2020, and the highest number of patients that were diagnosed with COVID-19 (81 patients) was between

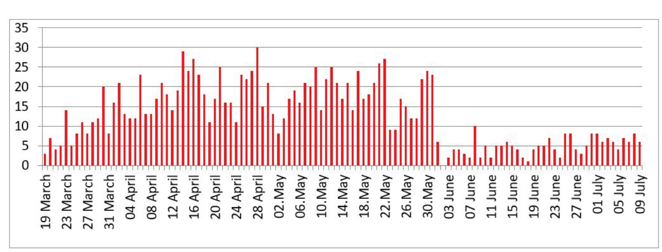

Figure 1. Number of patients admitted to the intensive care unit per day

Table 1. Demographic and clinical characteristics of all patients, COVID-19, non-COVID-19, COVID-19 surviving and COVID-19 dying groups

Variables	All patients	COVID-19 n=630	non-COVID-19 n=800	p	COVID-19 surviving n=365	COVID-19 dying n=265	p
Age*	71.26±15.3	69.98±15.3	72.3±15.3	0.001	67.44±16.4	73.40 ±12.8	<0.001
Female*	73.88±15	73.07±14.6	74.47±15.3	0.089	70.33±15.7	77.38±11.7	<0.001
Male*	69.09±15.3	67.59±15.3	70.33±15.1	0.006	64.98±16.6	70.83±13	0.001
Female (n)%	648 (45.3)	275 (43.65)	373 (46.62)	0.262	168 (46)	107 (40.4)	0.158
Male (n)%	782 (54.7)	355 (56.35)	427 (53.38)		197 (54)	158 (59.6)	
Symptoms	n(%)	n(%)	n(%)	p	n(%)	n(%)	p
Dyspnea	712(49.8)	320(51.2)	392(48.7)	0.347	171(46.8)	152(57.4)	0.009
Fever	335(23.4)	162(25.9)	173(21.5)	0.05	101(27.7)	61(23)	0.187
Chills/shivering	18 1.3)	7(1.1)	11(1.4)	0.678	4(1.1)	3(1.1)	0.966
Cough	302(21.1)	154(24.6)	148(18.4)	0.004	98(26.8)	56(21.1)	0.099
Sore throat	19(1.3)	11(1.8)	8(1)	0.209	9(2.5)	2(0.8)	0.106
Myalgia/joint ache	30(2.1)	13(2.1)	17(2.1)	0.967	10(2.7)	3(1.1)	0.161
Chest pain	46(3.2)	15(2.4)	31(3.9)	0.123	9(2.5)	6(2.3)	0.870
Nausea	57(4)	26(4.2)	31(3.9)	0.767	18(4,9)	8(3)	0.233
Vomiting	64(4.5)	22(3.5)	42(5.2)	0.124	15(4.1)	7(2.6)	0.322
Stomach ache	37(2.6)	12(1.9)	25(3.1)	0.161	9(2.5)	3(1.1)	0.227
Diarrhea	21(1.5)	10(1.6)	11(1.4)	0.716	7(1.9)	3(1.1)	0.436
General disorder	209(14.6)	87(13.9)	122(15.2)	0.512	48(13.2)	41(15.5)	0.409
Consciousness change	76(5.3)	26(4.2)	50(6.2)	0.086	13(3.6)	13(4.9)	0.402
Headache	24(1.7)	12(1.9)	12(1.5)	0.531	5(1.4)	7(2.6)	0.249
Loss of strength	60(4.2)	26(4.2)	34(4.2)	0.953	17(4.7)	9(3.4)	0.432
Syncope	18(1.3)	9(1.4)	9(1.1)	0.588	9(2.5)	0	0.010
Speech disorder	21(1.5)	5(0.8)	16(2)	0.064	4(1.1)	1(0.4)	0.316
Other neurological symptoms	12(0.8)	4(0.6)	8(1)	0.467	4(1,1)	0	0.087
Contact	21(1.5)	17(2.7)	4(0.5)	0.001	11(3)	6(2.3)	0.567
Trauma	9(0.6)	2(0.3)	7(0.9)	0.192	2(0.5)	0	0.227
Asymptomatic	51(3.6)	23(3.7)	28(3.5)	0.838	13(3.6)	9(3.4)	0.911
Other symptoms	74(5.2)	19(3)	55(6.8)	0.001	13(3.6)	6(2.3)	0.347
Comorbidities	n(%)	n(%)	n(%)	p	n(%)	n(%)	p
HT	695(48.6)	320(51.2)	375(46.6)	0.083	185(50.7)	136(51.3)	0.875
DM	447(31.3)	206(33)	241(29.9)	0.221	114(31.2)	93(35.1)	0.308
CAD	356(24.9)	161(25.8)	195(24.2)	0.505	90(24.7)	71(26.8)	0.544
CHF	154(10.8)	38(6.1)	116(14.4)	<0.001	26(7.1)	12(4.5)	0.177
Arrhythmia	77(5.4)	18(2.4)	59(7.3)	<0.001	9(2.5)	9(3.4)	0.489
COPD	205(14.3)	83(13.3)	122(15.2)	0.315	43(11.8)	40(15,1)	0.225
Asthma	74(5.2)	37(5.9)	37(4.6)	0.262	28(7.7)	9(3,4)	0.024
Kidney failure	178(12.4)	69(11)	109(13.5)	0.155	39(10,7)	31(11,7)	0.690
Malignancies	215(15)	76(12.2)	139(17.3)	0.007	40(11)	36(13.6)	0.318
Past CVE	115(8)	24(3.8)	91(11.3)	<0.001	12(3.3)	12(4.5)	0.422

Alzheimer's	79(5.5)	25(4)	54(6.7)	0.026	12(3.3)	13(4.9)	0.304
Parkinson's	28(2)	5(0.8)	23(2.9)	0.005	1(0.3)	4(1.5)	0.084
Dementia	43(3)	17(2.7)	26(3.2)	0.576	11(3)	6(2.3)	0.567
Other neurological disorders	36(2.5)	8(1.3)	28(3.5)	0.008	6(1.6)	2(0.8)	0.325
Rheumatological diseases	16(1.1)	3(0.5)	13(1.6)	0.043	3 (0.8)	0	0.139
Psychiatric diseases	24(1.7)	10(1.6)	14(1.7)	0.839	8(2.2)	2(0.8)	0.154
Liver diseases	19(1.3)	5(0.8)	14(1.7)	0.124	3(0.8)	2(0.8)	0.925
Thyroid disease	33(2.3)	16(2.6)	17(2.1)	0.576	11(3)	5(1.9)	0.375
Other	132 (9.2)	42 (6.7)	90 (11.2)	0.004	21 (5.8)	21 (7.9)	0.281
Supportive treatments in the ICU	n(%)	n(%)	n(%)	p	n(%)	n(%)	p
Nasal/mask oxygen	1063(74.3)	498(79.5)	565(70.2)	<0.001	320(87.7)	178(67.2)	<0.001
Nasal high flow	134(9.4)	102(16.3)	32(4)	<0.001	48(13.2)	54(20.4)	0.015
NIMV	160(11.2)	85(13.6)	75 (9.3)	0.011	33(9)	52(19.6)	<0.001
MV	648(45)	294(46.6)	354(44)	0.393	38(10.4)	256(96.6)	<0.001
Vasopressor /Inotrope	547(38)	249(39.5)	298(37)	0,434	34(9,3)	215(81.1)	<0.001
Hemodialisis	234(16.3)	102(16)	132(16.4)	0.840	30(8.2)	72(27.2)	<0.001
CRRT	14(1)	6(1)	8(1)	0.949	0	6(2.3)	0.004
ECMO	2 (0.1)	2 (0.3)	0	0.108	0	2(0.8)	0.096
Nursing care	475(33.1)	140(22.2)	335(41.6)	<0.001	86(23.6)	54(20.4)	0.343
APACHE-II Score*	17.42 ±10.7	17.49±10.8	17.36 ±10.6	0.977	11.74±6.2	25.42 ±10.8	<0.001
MV time (days)*, **	10.21±16.7	10.83±16.6	9.7±16.7	0.018	21.98±25.3	9.1±14.1	<0.001
Clinical course of the disease	n(%)	n(%)	n(%)	p	n(%)	n(%)	p
Mild	651(45.5)	264(42.2)	387(48.1)		257(70.4)	7(2.6)	
Severe	136(9.5)	72(11.3)	64(8)	0.021	70(19.2)	2(0.8)	<0.001
Critically severe	643(45)	289(46.2)	354(44)		38(10.4)	256(96.6)	
*(mean ± SD), **n=654							

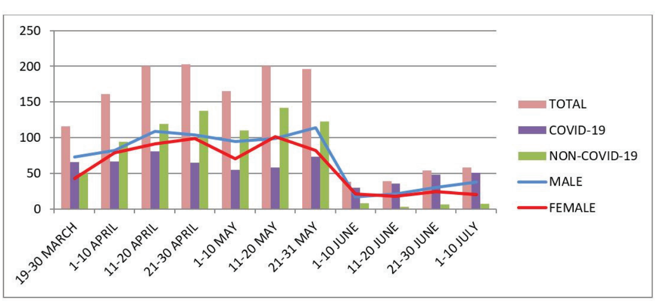

Figure 2. Distribution of patients over 10-day periods

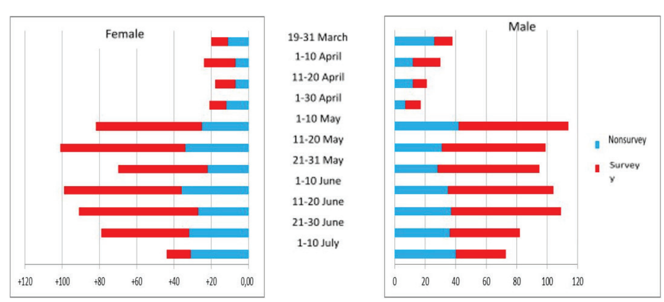

Figure 3. Hospital mortality of all patients by gender over 10-day periods

11st-20th April, 2020 (Figure 2). The patients' intensive care and hospital mortality rates were 37.8% (n=541) and 38.1% (n=545), respectively. The gender distribution in hospital mortality was homogeneous, and the hospital mortality of all patients by gender in 10-day periods is shown in Figure 3.

When patients were divided into COVID-19 and non-COVID-19, the mean age and male sex ratios of the groups were 69.98 and 72.3 (p=0.001), 56.35%, and 53.38% (p=0.262), respectively. Fever, cough, and contact were significantly more frequent in the COVID-19 group (p=0.05, p=0.004, p=0.001, respectively). Other symptoms (edema, hemoptysis, hematemesis, vaginal bleeding, aspiration, anaphylaxis, urinary incontinence, hypoglycemia, hematuria, constipation, positive result on screening, arrest, aggression, pericardial effusion, drug intoxication) were significantly higher in the non-COVID-19 group (p =0.001). The presence of congestive heart failure, arrhythmia, malignancy, previous cerebrovascular accident, and other neurological diseases, rheumatological and other diseases were significantly higher in the non-COVID-19 group. The need for nasal/mask oxygen, high flow oxygen (HFO), noninvasive mechanical ventilator (NIMV) among the supportive treatments applied in the ICU was significantly higher in the COVID-19 group, and the patients in need of care were significantly higher in the non-COVID-19 group (p<0.001, p<0.001). , p=0.011, p<0.001, respectively). While there was no significant difference between the two groups in terms of mean APACHE-II score, the duration of MV was longer in the COVID-19 group (p=0.977, p=0.018, respectively) (Table 1).

Of the 630 patients in the COVID-19 group, 365 (58%) survived and 265 (42%) died. While a significant difference was found between the mean age of the patients diagnosed with COVID-19 in the surviving and dying groups, 67.44 and 73.40 (p<0.001), respectively (p=0.158), there was no difference between the groups according to gender. Of the 630 patients in the COVID-19 group, 365 (58%) survived and 265 (42%) died. While a significant difference was found between the mean age of the patients diagnosed with COVID-19 in the surviving and dying groups (67.44 and 73.40 (p<0.001), respectively), there was no difference between groups in terms of gender distribution (p=0.158). The mean APACHE-II score was significantly higher in the dying group (25.52) compared to the surviving group (11.74) (p<0.001). Among the symptoms, dyspnea was significantly more common in the dying group and syncope was significantly more common in the surviving group (p=0.009, p=0.010, respectively). Asthma was more common comorbidity in the surviving group than the dying group (p=0.024). The frequency of other symptoms and the types of comorbidities were similar in both groups. The need for supportive treatments in the ICU other than ECMO was significantly higher in the dying group. MV duration was significantly longer in the surviving group (p<0.001). The clinical course of the disease in the dying group was significantly more severe than in the surviving group (p<0.001) (Table 1).

69.2% of 1430 patients were admitted to the ICU from the emergency department. The mean total hospitalizations of all patients in the hospital, in COVID-19 ICU and non-Covid-19 ICU, were 16.34, 10.14, 12.65 days, respectively. It was observed that in the COVID-19 and non-COVID-19 groups, patients were admitted to the ICU mainly from the emergency department. However, the acceptance of patients with COVID-19 from the pandemic services and outside medical institutions was higher than the non-COVID-19 group (p<0.001). The length of stay in hospital and ICU was significantly longer in the COVID-19 group than in the non-COVID-19 group (p=0.013, p=0.039, respectively). When the surviving and dying subgroups of COVID-19 patients were compared, it was found that most patients in both groups were admitted to the ICU from the emergency department. However, significantly more patients from the surviving group were admitted from the COVID-19 pandemic service (p=0.018). The mean total hospital stays in the COVID-19 surviving group was significantly longer than the dying group (p<0.001) (Table 2).

When the patients were divided into two groups according to the date of admission to the ICU, as the onset of the pandemic (March 19th, 2020 - May 31st, 2020) and the normalization period (June 1st, 2020 - July 10th, 2020), age, gender, and APACHE-II scores were similar. According to PCR positivity and thorax CT findings of the patients admitted to the ICU during the normalization period showed that the number of patients compatible with COVID-19 was significantly higher (p<0.001 for both). The ratio of patients admitted to COVID-19 to all patients was higher during the normalization period than at the onset of the pandemic (87.3%, 37.5%; respectively). Dyspnea and history of contact with a COVID-19 patient were detected more frequently in the normalization period, and vomiting, loss of strength and other symptoms were significantly more common at the onset of the pandemic (p=0.013, p<0.001, p=0.039, p=0.007, p<0.001, respectively). While congestive heart failure was the most common comorbidity at the onset of the pandemic, asthma was the most common comorbidity in hospitalized patients during the normalization period, and there was statistical significance (p= 0.035, p=0.028, respectively). Among the supportive treatments applied in the ICU, nasal high flow was applied significantly during the normalization period (p<0.001). The ratio of patients in need of care admitted to the ICU during the pandemic onset significantly higher (p=0.003) (Table 3).

The length of stay in the COVID-19 ICU and the length of stay in the COVID-19 services after the COVID-19 ICU

Table 2. Hospitalization times of all patients in the COVID-19, nonCOVID-19, COVID-19 surviving and COVID-19 dying group patients according to the hospitalization unit

Variables	All patients	n1	COVID-19	n2	non-COVID-19	n3	P1	COVID-19 Surviving	n4	COVID-19 Dying	n5	P2
Total length of stay in hospital *	16.34±17	1430	16.81 ±16.3	630	15.97 ±17.5	800	0.013	18.18±15.3	365	14.94±17.3	265	<0.001
COVID-19 length of stay in the ICU*	10.14±10.5	1430	10.4 ±10.4	630	9.94 ±10.5	800	0.312	9.92±9.2	365	11.05±11.9	265	0.490
Total length of stay in ICU *	12.65±15.1	1430	12.76±14.6	630	12.57 ±15.5	800	0.039	12.18±12.6	365	13.56±17	265	0.299
COVID-19 ward length of stay before COVID-19 ICU *	4.08±4.1	257	3.99 ±3.3	146	4.2 ±4.96	111	0.182	4.04±3.1	97	3.88±3.6	49	0.711
Non-COVID-19 ward length of stay before COVID-19 ICU*	10.47±13.1	43	8.96±14	23	12.2 ±12.2	20	0.095	5±7.4	10	12±17.2	13	0.343
COVID-19 length of stay in the service after COVID-19 ICU*	9.64±12.5	363	9.03±12.4	188	10.31 ±12.5	175	0.414	8.97±12.4	187	19	1	0.096
Non-COVID-19 ward length of stay after COVID-19 ICU *	10.62±10.2	26	11.5 ±8.8	6	10.35 ±10.8	20	0.494	11.5±8.8	6	0	0	-
Length of stay in non COVID-19 ICU after COVID-19 ICU *	18.3±22	196	17.51±20.7	85	18.91 ±23.1	111	0.428	15.83±16.6	52	20.15±25.9	33	0.728
COVID-19 ICU admission from	n(%)		n(%)		n(%)		<0.001	n(%)		n(%)		0.069
Emergency	989(69.2)		386(61.3)		60 (75.4)		<0,001	217(59.5)		169(63.8)		0.272
Pandemic ward	257(18)	1430	146(23.2)	630	111(13.9)	800	<0,001	97(26.6)	365	49(18.5)	265	0.018
Outer hospital	141(9.9)		75(11.9)		66(8.3)		0,021	41(11.2)		34(12.8)		0.541
Non-COVID ward (n)%	43(3)		23(3.7)		20(2.5)		0,206	1 (2.7)		13(4.9)		0.152
Transfer location from COVID-19 ICU	n(%)		n(%)		n(%)		<0.001	n(%)		n(%)		**<0.001**
Pandemic ward	353(24.7)		187(29.7)		166(20.8)		<0,001	187(51.2)		0		<0.001
Non-COVID-19 YICU	201(14.1)		85(13.5)		116(14.5)		0,586	52(14.2)		33(12.5)		0.515
Home	278(19.4)	1430	87(13.8)	630	192(24)	800	<0,001	87(23.8)	365	0	265	<0.001
Outer hospital	109(7.6)		33(5.2)		76(9.5)		**0,003**	33(9)		0		**<0.001**
Exitus	461(32.2)		231(36.7)		229(28.6)		0,001	0		231(87.2)		**<0.001**
Non-COVID-19 ward	28(2)		7(1.1)		21 (2.6)		**0,040**	6(1.6)		1(0.4)		**<0.001**

*(mean ±SD), days; n^1 number of all patients, n^2 number of patients in the COVID-19 group, n^3 Number of patients in the non-COVID-19 group; n^4 number of patients in the COVID-19 surviving group, n^5 number of patients in the COVID-19 dying group; p^1 comparison of COVID-19 and non-COVID-19 groups; p^2 comparison of COVID-19 surviving and COVID-10 dying groups

Table 3. Characteristics of patients admitted to the intensive care unit during the onset of the pandemic and normalization period

Variables	Pandemic onset period n=1241	Normalization period n=189	p
Age (average)	71.39±15.4	70.38±14.7	0.196
Female age*	74.01±14.8	72.98±16.4	
Male age*	69.20±15.6	68.35±13	
Gender	n(%)	n(%)	0.678
Female	565(45.5)	83(43.9)	
Male	676(54.5)	106(56.1)	
APACHE Score*	17.4±10.8	17.54±10.2	0.626
COVID-19 PCR result	n(%)	n(%)	<0.001
Positive	177(14.3)	131(69.3)	
Negative	1043(84)	58(30.7)	
No test	21(1.7)	0	
Toraks BT bulguları	n(%)	n(%)	<0.001
COVID-19 compatible	417(33.6)	137(72.5)	
COVID-19 suspicious	538(43.4)	40(21.2)	
COVID-19 incompatible	286(23)	12(6.3)	
COVID-19 patients	465(37.5)	165(87.3)	<0.001
PCR result positive	177(14.3)	131(69.3)	
PCR negative, clinical and radiologically compatible	288(23.2)	34(18)	
Non-COVID-19 patients	776 (62.5)	24(12.7)	
Admission to COVID-19 ICU from	n(%)	n(%)	p
Emergency	892(71.9)	97(51.3)	<0.001
Pandemic ward	209(16.8)	48(25.4)	0.004
Outer hospital	102(8.2)	39(20.6)	<0.001
Non-COVID ward	38(3.1)	5(2.6)	0.755
Total length of stay in hospital*	16.49±17	15.35 ±17.1	0.103
COVID-19 length of stay in the ICU*	10.35 ±10.8	8.8±8.2	0.045
Total length of stay in ICU*	12.76±14.9	11.96±16.7	0.079
COVID-19 ward length of stay before COVID-19 ICU*	4.02 ±4.3	4.31 ±3.1	0.110
Non-COVID-19 ward length of stay before COVID-19 ICU*	11.42±13.7	3.2±3	0.128
COVID-19 length of stay in the ward after COVID-19 ICU*	10.16±13.3	6.91±6	0.025
Non-COVID-19 ward length of stay after COVID-19 ICU*	10.79±10.6	8.5±2.1	0.812
Length of stay in non-COVID-19 ICU after COVID-19 ICU*	17.69±20.6	22.11±30	0.988
MV time (days)	10.37 ±16.5**	9.28 ±17.4***	0.625
COVID-19 ICU admission from	n(%)	n(%)	<0.001
Pandemic ward	295(23.8)	58(30.7)	0.04
Non-COVID-19 ICU	174(14)	27(14.3)	0.922
Home (n)%	268(21.6)	11(5.8)	<0.001
Outer hospital (n)%	93(7.5)	16(8.5)	0.639

Exitus (n)%	385(31)	75(39.7)	0.018
Non-COVID-19 ward (n)%	26 (2.1)	2(1.1)	0.338
Mortalite In the ICU (n)%	457(36.8)	84(44.4)	0.044
Kadın (n)%	205(36.3)	37(44.6)	0.145
Erkek (n)%	252(37.3)	47(44.3)	0.164
Hospital mortality (n)%	461(37.1)	84(44.4)	0.054
Female(n)%	207(36.6)	37(44.6)	0.163
Male(n)%	254(37.6)	4 (44.3)	0.183
Symptoms	**n(%)**	**n(%)**	**p**
Dyspnea	602(48.5)	110(58.2)	0.013
Fever	284(22.9)	51(27)	0.215
Chills/shivering	16(1.3)	2(1.1)	0.711
Cough	254(20.5)	48(25.4)	0.122
Sore throat	15(1.2)	4(2.1)	0.310
Myalgia/joint ache	25(2)	5(2.6)	0.573
Chest pain	42(3.4)	4(2.1)	0.357
Nausea	51(4.1)	6(3.2)	0.540
Vomiting	61(4.9)	3(1.6)	0.039
Stomach ache	34(2.7)	3(1.6)	0.353
Diarrhea	29(1.5)	2(1.1)	0.615
General disorder	180(14.5)	29(15.3)	0.761
Consciousness change	71(5.7)	5(2.6)	0.079
Headache	19(1.5)	5(2.6)	0.267
Loss of strength	59(4.8)	1(0.5)	0.007
Syncope	18(1.5)	0	0.096
Speech disorder	21(1.7)	0	0.072
Other neurological symptoms	11(0.9)	1(0.5)	0.616
Contact	11(0.9)	10(5.3)	<0.001
Trauma	9(0.7)	0	0.240
Asymptomatic	4(3.7)	5(2.6)	0.494
Other symptoms	72(5.8)	2(1.1)	0.006
Comorbidities	**n(%)**	**n(%)**	**p**
DM	381(30.7)	66(34.9)	0.244
HT	591(47.6)	104(55)	0.058
CAD	304(24.5)	52(27.5)	0.372
CHF	142(11.4)	12(6.3)	0.035
Arrhythmia	69(5.6)	8(4.2)	0.451
COPD	183(14.7)	22(11.6)	0.256
Asthma	58(4.7)	16(8.5)	0.028
Kidney failure	159(12.8)	19(10.1)	0.284
Malignancies	194(15.6)	21(11.1)	0.105
Past CVE	105(8.5)	10(5.3)	0.135

Alzheimer's	70(5.6)	9(4.8)	0.622
Parkinson's	24(1.9)	4(2.1)	0.866
Dementia	41(3.3)	2(1.1)	0.092
Other neurological disorders	35(2.8)	1(0.5)	0.061
Rheumatological diseases	16(1.3)	0	0.116
Psychiatric diseases	24(1.9)	0	0.054
Liver diseases	18(1.5)	1(0.5)	0.303
Thyroid disease	27(2.2)	6(3.2)	0.394
Other	113(9.1)	19(10.1)	0.675
Supportive treatments in intensive care	**n(%)**	**n(%)**	**p**
Nasal/mask oxygen requirement	920(74.1)	143(75.7)	0.638
Nasal high flow	82(6.6)	52(27.5)	<0.001
NIMV	131(10.6)	29(15.3)	0.52
MV	553(44.5)	95(50)	0.208
Vasopressor / inotrope need	473(38)	72(38)	0.792
Hemodialysis	191(15.3)	35(18.5)	0.480
CRRT	14(1.1)	0	0.142
ECMO	2(0.2)	0	0.581
Nursing care	420(34.6)	45(23.8)	0.003
Clinical course of the disease	**n(%)**	**n(%)**	**p**
Mild	585(47.1)	66(34.9)	**<0.001**
Severe	106(8.5)	30(15.9)	
Critically severe	550(44.3)	93(49.2)	

*(mean ± SD), **n=558, ***n=96

were significantly longer at the pandemic onset (p=0.045, p=0.025; respectively). The places where the patients were transferred from the COVID-19 ICU differed significantly between the two periods (p<0.001). During the normalization period, the ratio of patients who were transferred to the COVID-19 service and died was significantly higher (p=0.04, p=0.018, respectively). In the initial pandemic period, the rate of patients discharged home was found to be significantly higher (p<0.001). When intensive care and hospital mortality rates were compared, an increase was observed in both intensive care and hospital mortality during the normalization period. However, the increase in intensive care mortality was statistically significant (p=0.044). The gender distribution of the patients who died in the ICU and hospital was similar in both periods, and the mortality rate was higher in the male gender. ICU mortality rates were 37.3% and 44.3%, and hospital mortality rates were 37.6% and 44.3%, respectively, for the male gender during the pandemic onset and normalization period (Table 3).

Discussion

The hospital where the study was conducted is the largest in the region and country, with 3810 beds and 696 intensive care beds, 500 of which are adults, and is therefore serving as a pandemic hospital since March 19th, 2020. Since the number of intensive care beds, mechanical ventilator and monitor systems in the hospital is sufficient, patients with a diagnosis of COVID-19, suspected of COVID-19, or those who need intensive care during the onset of the pandemic, who need care without intensive care, who may require routine dialysis and close contact or patients whose diagnosis could not be concluded were followed up in single rooms with negative pressure in the COVID-19 ICUs to minimize the risk of transmission until their diagnosis of COVID-19 was finalized. In the normalization period, unlike the initial period of the pandemic, all patients with a diagnosis of COVID-19, who did not need intensive care, or who might require routine dialysis and close contact, or whose diagnosis of COVID-19 could not be excluded, were followed up in the service with a companion whenever possible.

In order to meet the increasing need for intensive care beds in China, where the pandemic first emerged, and then in Italy, which has become the center of the pandemic in Europe, new regulations have been made to increase the intensive care bed capacity (8,9,10). On the dates of this study, there was no need to create new intensive care areas in our hospital. The existing ICUs were sufficient to meet the need. However, branch ICUs such as neurology, neurosurgery, and general surgery also accepted COVID-19 patients, as did general ICUs under the leadership of the intensive care clinic. In the initial period of the pandemic, a maximum of 30 patients were admitted to ICU per day, and according to the second algorithm changed after the start of the normalization process, a maximum of 10 patients were admitted to ICUs per day. The difference may be the decrease in the number of newly diagnosed patients during the normalization period, the increased inexperience and the difference in the algorithms applied accordingly, namely the decrease in the acceptance of care patients and dialysis patients who do not need intensive care.

In the literature, there are two studies reported from England and Brazil comparing COVID-19 and non-COVID-19 patient data (10,11). In both studies, the non-COVID-19 patient group was formed from patient data from the pre-pandemic period. In the study reported from England, the data was obtained from intensive care patients between 2017-2019, and in the study in Brazil, data of patients in the ICU in 2019. The present study, however, it differs from other studies in that all patient data belong to non-COVID-19 patients followed in the ICU during the pandemic period. In a study from Brazil, the mean age of non-COVID-19 patients (72.36) was higher than that of COVID-19 patients (65.19), similar to the data of our study (12). Although not statistically significant, in our study, the male gender was higher in both the COVID-19 and non-COVID-19 groups, similar to the results of the other two studies (10,11). It has been emphasized in other studies that the male gender is more frequent among COVID-19 patients admitted to the ICU (12,13,14). The first three most common symptoms in patients in the COVID-19 group were dyspnea, fever and cough, similar to previous studies (13,14,15,16). Considering that the disease is transmitted by airborne transmission, contact is an important factor in the spread of the disease, and accordingly, the contact rate was higher in the COVID-19 group (17). The symptoms specified under the heading of other symptoms, which are not symptoms of COVID-19 but can also be seen in COVID-19 patients due to other comorbidities in the patients, were also higher in the non-COVID-19 group as expected. Hypertension and diabetes were the two most common comorbidities in all patients and the COVID-19 group, similar to the results of other studies (18,19,20). While there was no statistical difference in the frequency of hypertension and diabetes between the COVID-19 and non-COVID-19 groups, the comorbidity group with all malignancies, regardless of hematological or solid malignancy, was significantly more common in non-COVID-19 patients, and the results were similar in Brazil (11). In addition, it has been shown that comorbidities such as hematological malignancy, immunocompromised and metastatic disease are more common in the non-COVID-19 group (10).

The ground-glass density appearance, one of the thoracic CT radiological findings of COVID-19, is not specific to COVID-19 and can also be seen on thorax CT of patients with loading findings due to heart failure or pulmonary edema (21). However, it should be kept in mind that signs of failure due to cardiac involvement may also develop in COVID-19 (22). Due to the similarity of COVID-19 with thoracic CT findings, patients who applied to the hospital with pulmonary edema or heart failure findings and needed intensive care during the pandemic period were followed in the ICU until COVID-19 was ruled out. Therefore, we believe that congestive heart failure is significantly higher in the non-COVID-19 group. Similarly, nursing care patients were admitted to intensive care until the diagnosis of COVID-19 was confirmed or ruled out. Since there may be comorbidities such as previous cerebrovascular disease (CVD), and other neurological diseases in patients who need nursing care. These comorbidities were significantly higher in the non-COVID-19 group.

Rheumatological diseases were also significantly higher in the non-COVID-19 group. Although it is difficult to evaluate due to the low number of cases with rheumatological diseases, it may be because corticosteroids or other anti-inflammatory drugs, which are used in the treatment of rheumatological diseases are also included in the COVID-19 treatment guide, or people with the rheumatological disease who use these drugs need less intensive care when they get COVID-19. However, these assumptions are all separate research topics (23-25) .

HFO and NIMV applications in intensive care are among the treatment methods used in hypoxic respiratory failure.

In the COVID-19 group, which revealed hypoxemia and progressed from respiratory failure to ARDS, the need for nasal/mask oxygen, HFO, and NIMV was higher since respiratory failure was prominent, similar to the results of the other study (11). In addition, the duration of MV was longer in the COVID-19 group, similar to the study in Brazil (10). The mean APACHE-II score (17.49) of the COVID-19 patient group was similar to the APACHE-II score (score 18) of the study reported from Canada (25). In a study in England, the APACHE-II score was similar between the COVID-19 and non-COVID-19 groups as in our study, and the most frequent admission to the ICU was from the wards (10). In this study, a large proportion of all COVID-19 and non-COVID-19 patients were admitted to the ICU primarily from the emergency department and the second most common from the COVID-19 services. The number of patients admitted to the ICU from the pandemic wards in the COVID-19 group is higher than the non-COVID-19 group. It can be explained by the fact that patients diagnosis with the COVID-19 are more stable on admission and are hospitalized inwards first. Then the respiratory failure progresses rapidly and they require intensive care. The rate of COVID-19 and non-COVID-19 patients admitted from other centers was higher than the UK data which can be explained by the fact that the hospital where our study was conducted was a pandemic hospital with higher intensive care bed capacity (10). Similar to other studies, the total hospital and total ICU length of stay were longer in the COVID-19 group than in the non-COVID-19 group which can be explained because COVID-19 is a complex disease with multisystem involvement as well as respiratory failure. (10,11).

Advanced age and male gender are risk factors for mortality in COVID-19 (12,16,26,27). Consistent with the data from the literature, the mean age of the patient group who died from COVID-19 was higher and the male sex ratio was higher, although not significant. Although dyspnea, the main symptom of respiratory failure, was not significant, the need for supportive treatment methods in the ICU was higher as it was more common in the COVID-19 dying group. In patients who need IMV due to respiratory failure due to COVID-19 and ARDS, weaning from MV may be prolonged concerning the recovery time of other organ failures that may develop during the follow-up of ARDS. Consistent with a previous study, the duration of stay in MV was longer (14). The need for vasopressor/inotrope, hemodialysis, and CRRT, which show progression to shock and organ failure, and are the symptoms of the the disease's poor prognosis during intensive care follow-up, was higher in the COVID-19 dying group, similar to previous studies (13,17). The APACHE-II score, an indicator of mortality and is the most important parameter related to mortality in intensive care studies, was significantly higher in the COVID-19 dying group than the COVID-19 surviving group (10). In the surviving COVID-19 group, the number of patients admitted from the wards was higher. In other words, the survival of patients admitted from the service was higher. Since treatments can be started in the ward before intensive care arises, the need for intensive care can be recognized early in the warding process, leading to faster intensive care support treatments. In our hospital, HFO and/or NIMV treatments are primarily applied in ICUs. Patients with deep hypoxemia and increased oxygen demand may be taken from the ward to the ICU and immediately initiating treatments such as HFO and/or NIMV in addition to their medical treatments may have increased survival. Similar to previous studies, the total hospital stay in the COVID-19 surviving group was extended than the COVID-19 dying group (10,11,14). The fact that the duration of stay in the MV in the COVID-19 surviving group is longer than in the dying group, consistent with other studies, may be related to the long and challenging recovery process of ARDS (14). When the characteristics of the patients admitted to the ICU during the onset of the pandemic and the normalization period in our hospital were compared, there was no significant difference between the demographic characteristics, APACHE-II score, and comorbidities other than asthma. However, during the normalization period more patients with a confirmed diagnosis of COVID-19 were admitted to the ICU due to the change in the hospital intensive care admission algorithm. In addition, the reasons why the contact history, which is one of the most important factors in the spread of the disease, is more frequent during the normalization period, can be due to the algorithm change, admission of the patients diagnosed with COVID-19, not the suspicious ones, to the ICU, or the society not complying with the rules like stretching the hygiene rules, mask and distance, depending on the wrong perception of normalization. The rate of symptoms such as other disease symptoms and signs of neurological diseases such as loss of strength was also higher in the initial period of the pandemic. The admission of nursing care patients to the ICU during the initial period of the pandemic, as required by the algorithm, may have led to the detection of symptoms such as loss of strength that are already present in these patients more frequently.

About 2.5 months after the pandemic started in the world, we encountered COVID-19 for the first time. Even if we closely follow the countries's experiences before us, it was not as easy to implement in practice as in theory. The number of deaths announced from various parts of the world in the media and social media related to the highly contagious COVID-19 and increasing day by day has led everyone to approach the disease cautiously. At the beginning of the pandemic, the ministry of health tried to set goals for making correct diagnosis, preventing the spread of the disease, and using hospital resources effectively and correctly. In line with these goals, all suspected COVID-19 cases were tried to be followed and treated by the determined algorithm. Again in this period, in order to respond to the increasing number of patients, arrangements were required in services, laboratories, other units, and ICUs. For example, at the beginning of the pandemic, PCR tests were performed in the out-of-hospital Public Health Center and mostly resulted in ≥48 hours. However, now PCR tests can also be studied in our hospital and can be concluded in a short time, such as 6-8 hours. Thus, the diagnosis of COVID-19 of patients was confirmed faster. We assume these arrangements worked out, taking the higher rate of PCR-positive patients in the normalization period into account. Although PCR is a valuable test for COVID-19, it may sometimes be insufficient to diagnose of the disease and may need confirmation by retesting clinical examination or radiological findings (28). Therefore, the diagnosis of COVID-19 cannot be definitively excluded in cases with negative PCR results (29).

Thoracic CT is important in diagnosing of patients with moderate to severe respiratory failure whose clinical and laboratory findings are compatible with COVID-19 but have a negative PCR test (29). We believe that as radiologists become more familiar with the thoracic CT findings of COVID-19 over time, they can provide clinicians with more precise information about the presence or absence of COVID-19. The fact that the experience of physicians increased on COVID-19 during the normalization period and their knowledge in the light of new studies in the literature can be the reason for the lower rate of patients diagnosed with COVID-19 with radiological findings during the normalization period. It should also be kept in mind that the total number of HFO devices in our hospital was lower than the normalization period in the first days of the pandemic. As the awareness of patients benefiting from HFO increased, new HFO devices were procured (30). While the first reason for using more HFOs during the normalization period is more HFO devices, the second reason can be explained by the fact that more COVID-19 patients with respiratory failure were admitted to the ICU during this period the effectiveness of HFO treatment in COVID-19 was noticed.

This hospital, which has the highest intensive care bed capacity in the region and the country, has enabled patients with suspected COVID-19 at the beginning of the pandemic period and need the care to be followed up and treated in the ICU until the diagnosis of COVID-19 is confirmed. During the normalization period, the diagnosis was accelerated with earlier PCR results, and patients in need of care were admitted to appropriate services according to test results and radiology findings. This way, the disease transmission from patients to their relatives or among other health workers was minimized. Thus, the use of COVID-19 ICU beds became more effective.

In both periods, the most frequent admission to the ICU was from the emergency department, but this rate was higher in the first period than the normalization period. One of the reasons for this is that, as mentioned above, all patients, including COVID-19 suspected care patients and dialysis patients, were admitted to the ICU during the onset of the pandemic. Another reason for the high number of patients coming directly from the emergency department to the ICU in the early period may be the delay in admission to the hospital, and the increased need for intensive care due to the poor knowledge of the disease and its symptoms. Since such cases were higher in the initial period, admission to the emergency room increased rapidly. In order to reduce the patient load in the emergency room, critically ill patients were followed up in the COVID-19 ICUs until COVID-19 was excluded. The high admission rates of patients from pandemic services during the normalization period were no longer because of suspected patients with COVID-19 but rather the admission of patients who needed intensive care and were diagnosed with COVID-19 while being followed in the services to the ICU. Again, during the normalization period, patient admission from other centers to the ICU was more frequent. It may be because the hospital is the central pandemic hospital in the city, and patients diagnosed with COVID-19 are primarily directed here from other centers. The intensive care capacities of other hospitals were less. The reason why patients were hospitalized longer in the initial period of the pandemic in the COVID-19 ICU was that even if the PCR tests of the patients who needed care became negative, the patients could be sent to their homes or out-of-hospital care centers after the 14-day isolation period was completed in the ICU in line with the recommendation of the infectious diseases. Again, patients who were transferred from the ICU to the COVID-19 ward were discharged after completing their isolation period in the hospital. After the treatment of COVID-19 patients in the ICU was completed, the patients who did not need intensive care were either discharged home or transferred to the COVID-19 or non-COVID-19 services according to the discharge algorithm from the ICU. Those who continued to need intensive care were transferred to the non-COVID-19 ICU in or out of hospital. We believe that the high rate of discharge home from the ICU during the onset of the pandemic was because the patients were completing the hospitalization period in intensive care. Because in this period, as mentioned before, these patients completed their isolation period in the ICU and were discharged home from the ICU. On the other hand, the rate of patients transferred to the COVID-19 services during the normalization period was higher. In this normalization period, the clinical course of the patients more severe. The need for HFO, NIMV, MV was higher because they care and dialysis patients who do not need intensive care were not followed up in the ICU, and the rate of patients diagnosed with COVID-19 in the ICUs was higher. Patients who did not require these treatments were followed up in the ward for nasal oxygen or other treatments for a while. It may be that the mortality is higher during the normalization period, the rate of COVID-19 patients is higher in the normalization period compared to the onset of the pandemic, and the mortality rate in COVID-19 patients is higher than in non-COVID-19 patients. The limitation of our study is that it is retrospective.

As a result, the initial period of the pandemic was spent understanding COVID-19, which entered our lives as an unknown. At the same time, it was a guiding period for us to treat patients more effectively while protecting the community and healthcare professionals. Thanks to this knowledge and skill gained, systemic changes were made that could benefit patients during and after the normalization period. This hospital continues to be a pandemic hospital. The superiority of our study to other studies is that it is single-centered, the number of patients is higher, and patients were admitted to 14 ICUs with the same algorithm. There are studies in the literature on COVID-19 patients followed in the intensive care unit, where the number of patients is higher than our study, but these are generally multicenter studies. Although ICU indication criteria have been determined in the literature, these criteria may change in favor of the general health policy in exceptional cases such as pandemics, depending on the intensive care bed capacity, the number of intensive care doctors, nurses, and auxiliary personnel, and the adequacy of other devices such as MV, monitor. We believe that intensive care is used safely and effectively for patients, healthcare professionals, and society with the algorithms applied. Another feature of this study that differs from other studies is that it compares COVID-19 and non-COVID-19 patients admitted to the ICU during the pandemic period.

Ethics

Ethics Committee Approval: After the ethics committee's approval (Ethics committee no: E1-20-527), all patients aged 18 years and older who were followed up in 14 COVID-19 ICUs between 19 March and 10 July 2020 were included in the study.

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: B.D.K., G.M.K., N.M.M., I.Ö.T., Concept: B.D.K., N.M.M., I.Ö.T., Design: B.D.K., N.M.M., I.Ö.T., Data Collection or Processing: B.D.K., G.M.K., Analysis or Interpretation: B.D.K., N.M.M., T.T.P., Ö.B.S., Literature Search: B.D.K., T.T.P., Writing: B.D.K., T.T.P., Ö.B.S.

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