Ann Med Res

Current issue list available at AnnMedRes

Annals of Medical Research

journal page: www.annalsmedres.org

Analysis of patients admitted to the intensive care unit from the emergency department

Mustafa Alpaslan[a], Necmi Baykan[b,*], Muhammed Zubeyir Kose[a], Ayse Sule Akan[b], Omer Salt[b]

[a] *Nevşehir State Hospital, Clinic of Emergency Medicine, Nevşehir, Türkiye*
[b] *Kayseri City Hospital, Department of Emergency Medicine, Kayseri, Türkiye*

ARTICLE INFO

Keywords:
Emergency department
Intensive care unit
Mortality
Comorbid disease

Received: Apr 24, 2024
Accepted: Jul 08, 2024
Available Online: 26.07.2024

DOI:
10.5455/annalsmedres.2024.04.073

Abstract

Aim: To analyze the effects of these data on mortality by examining the demographic data, laboratory findings, most common reasons for hospitalization, duration of hospitalization according to diagnosis and clinics of patients admitted to intensive care units from the emergency department.

Materials and Methods: This study was a retrospective analysis of patients hospitalized in the intensive care unit of a secondary care hospital between 01.01.2022 and 31.12.2022. Demographic data, comorbid diseases, laboratory data, diagnosis and length of hospitalization were determined. In-hospital mortality rates were determined and comparative analyses of demographic data and mortality were performed according to diagnoses.

Results: The study included 1245 patients. The mean age of the patients was 69.23±15.97 years and 59.9% were male. The most common comorbidities were hypertension (43.5%), diabetes mellitus (23.9%) and coronary artery disease (21%). Cardiology (46.6%), pulmonology (16.3%) and internal medicine (15.7%) were the clinics that admitted the most patients, respectively. The most common diagnoses were acute coronary syndrome (45.7%), pneumonia (22.6%) and acute renal failure (8%). The mean duration of hospitalization was 11.76±7.80 days. The duration of hospitalization was significantly higher in patients with exitus and was 14.93±12.25 days (p=0.000). While 52.4% of the patients were discharged, in-hospital mortality rate was 47.6%. 65.7% of the patients were over 65 years of age and the highest rate of hospitalization was 41.8% in patients over 75 years of age. Although there was a significant difference between the diagnosis and the duration of hospitalization (p=0.000).

Conclusion: Comparison of the data between discharged and in-hospital exitus patients in patients admitted to the intensive care unit from the emergency department showed mostly significant differences. Predicting the mortality of these patients, determining the severity of the disease and determining the factors affecting the length of hospitalization are important for the development of new treatment protocols.

Introduction

Intensive care units (ICUs) are special units that take part in the treatment process of diseases and are developed for close observation and treatment of conditions such as organ failure with high risk to life. Although the number of healthcare personnel per patient is higher in these units, ICUs have higher technological equipment compared to other units [1]. Since ICUs serve patients with more severe disease levels, the mortality rate is also higher compared to other units [2]. Although infections are the leading factor affecting mortality, patient age, interventional procedures and underlying diseases are also effective [3,4]. It has been reported that pneumonia, cardiopulmonary arrest, sepsis and arrhythmias are the most common causes of death in patients hospitalized in ICU [5]. In addition, it was observed that the majority of patients hospitalized in the ICU were elderly and immunocompromised [5]. In studies conducted in our country, it was reported that the mortality rate in ICU was between 20.5-40.2% [3].

Although ICUs have fewer beds throughout the hospital, the costs of ICUs to the hospital budget are quite high due to the severity of the patients followed up, the procedures performed and strict follow-up [2,6]. One of the

*Corresponding author:
Email address: drnecmibaykan@gmail.com (Necmi Baykan)

most important markers of hospital service quality and performance is ICU mortality rates [6]. For these reasons, studies on the use of ICU and the evaluation of mortality rates are increasing [2].

In the world and in our country, where the general and aging population is increasing, the demand for intensive care beds is gradually increasing. The fact that intensive care treatments are expensive and the number of beds is limited necessitates careful selection of patients who will benefit from hospitalization in the ICU [1]. It is important for physicians and other healthcare personnel working in the ICU to know the risk factors for mortality and to take necessary precautions [4].

In this study, we aimed to analyze the effects of these data on mortality by examining the demographic and laboratory findings of patients admitted to ICUs from the emergency department.

Materials and Methods

This study was a retrospective analysis of patients admitted to the ICU from the adult emergency clinic of a hospital providing secondary health care services in a one-year period between 01.01.2022-31.12.2022. In the specified date range, 1.287 patients were hospitalized from the emergency department to the intensive care unit. All of these patients were analyzed and patients with insufficient data were excluded. Patients admitted to the ICU from outside the emergency department were excluded from the study. In the mortality evaluation, in-hospital mortality rates were determined by excluding patients referred to another center and patients who died after discharge. In addition to demographic data such as age, gender, time of admission, presence of comorbidities, the diagnosis and the hospitalization clinic were determined. The data obtained from the laboratory tests performed at the time of admission to the emergency department without being admitted to the ICU were analyzed. In laboratory values, white blood cell, hemoglobin and platelet values were analyzed in the hemogram test. Blood urea nitrogen (BUN) (10-20 mg/dL) and creatinine (0.50 -1.40 mg/dL) values outside the normal reference range were considered as impaired renal function test (RFT). Similarly, those with aspartate aminotransferase (AST) (15-50 IU/L), alanine aminotransferase (ALT) (15-40 IU/L), gamma glutamyl transferase (GGT) (5-55 IU/L) and bilirubin (0.3-1.0 mg/dL) values outside the normal reference range were considered as impaired liver function test (LFT). Patients with any of hyponatremia, hypernatremia, hyperkalemia and hypokalemia were evaluated under the title of electrolyte disorder. Pathologic values in arterial blood gas obtained in room air were evaluated as metabolic acidosis and respiratory acidosis. C-reactive protein (CRP) and blood lactate levels were also analyzed.

The clinics where the patients were hospitalized, diagnoses, length of hospital stay and in-hospital mortality were analyzed. Data of discharged and deceased patients were compared. Gender, age range, length of hospital stay and mortality status were compared according to the diagnoses of the patients. The hospital electronic data system (SISOFT hospital software system) was used to collect patient data. Hacıbektaş Veli University Non-Interventional Clinical Research Ethics Committee Approval numbered 2023/06 and dated 21/07/2023 was obtained.

Statistical analysis

The data collected in our study were subjected to statistical analysis using SPSS (Statistical Package for Social Sciences) program version 21.0 (SPSS Inc., Chicago, IL, United States). Kolmogorov-Smirnov, ShapiroWilk, Skewness and Kurtosis tests were performed to evaluate the normality of continuous variables. Among continuous variables, those with normal distribution were presented as mean±standard deviation, and those that did not show normal distribution were presented as median and 25-75th percentile. Categorical data were compared using Pearson Chi-square (χ^2) test and Fisher exact test. Parametric data were compared using the Independent Groups T-Test, and non-parametric data were compared using the Mann Whitney U Test. In this study, the statistical significance level was 95% and was defined as $p<0.05$.

Results

Within the scope of the study, 1,245 patients were evaluated. The mean age of the patients was 69.23±15.97 years and 59.9% were male. It was observed that most patient admissions were made in July (11.2%) (Figure 1) and generally between 08.00-15.59 hours (47.6%) (Table 1). Hospitalizations were more frequent on weekdays (74.7%). The most common comorbidities were hypertension (HT) (43.5%), diabetes mellitus (DM) (23.9%) and coronary artery disease (CAD) (21%). 39.4% of the patients had RFT abnormalities, 9.6% had LFT abnormalities and 7.1% had electrolyte abnormalities. When blood gas values were analyzed, 84.7% of the patients had no pathology. Cardiology (46.6%), pulmonology (16.3%) and internal medicine (15.7%) were the most frequently admitted clinics (Figure 2). The most common diagnoses were acute coronary syndrome (ACS) (45.7%), pneumonia (22.6%) and acute renal failure (ARF) (8%) (Figure 3). The mean duration of

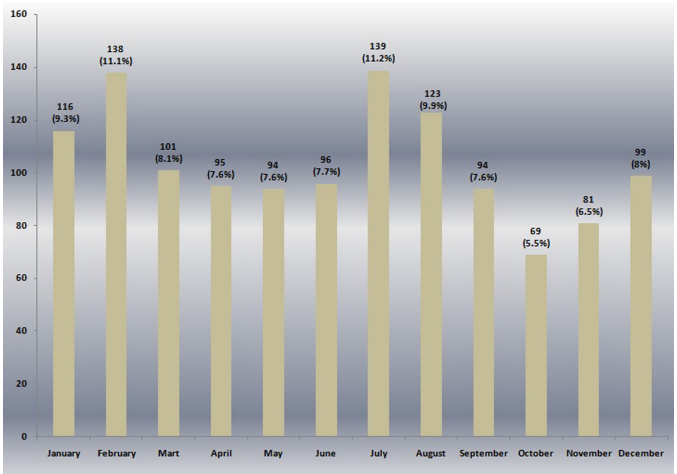

Figure 1. Distribution of the number of patients hospitalized in intensive care unit according to months. (The data in the graph consists of the number of patients (n) and percentage rate (%)).

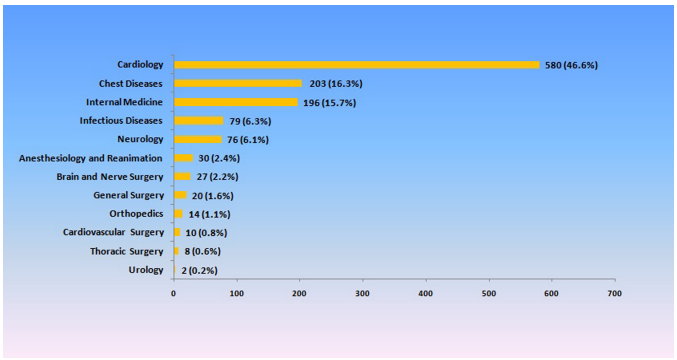

Figure 2. Distribution of the number of patients hospitalized in intensive care unit according to branches. (The data in the graph consists of the number of patients (n) and percentage rate (%)).

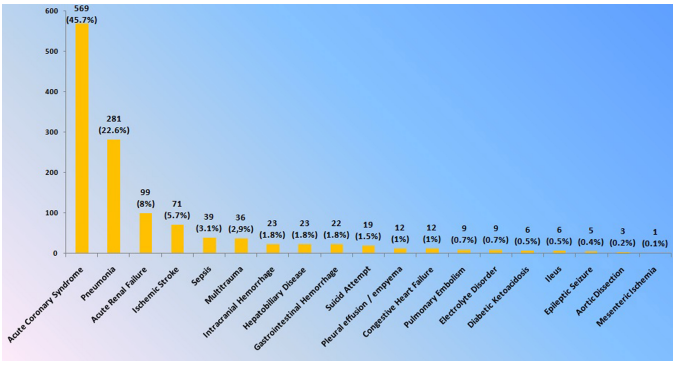

Figure 3. Diagnosis distribution of patients hospitalized in intensive care unit. (The data in the graph consists of the number of patients (n) and percentage rate (%)).

hospitalization was 11.76±7.80 days. While 52.4% of the patients were discharged, in-hospital mortality rate was 47.6%. The comparison of the discharged patients and the patients with exitus is given in Table 1.

According to the results, the discharge rate was higher in the male gender (59.5%) and the mortality rate was higher in the female gender (58.3%). The mean age of the patients who were excluded was significantly higher (p=0.000). The mortality rate was higher in patients with comorbidities such as HT (p=0.000), chronic obstructive pulmonary disease (COPD) (p=0.000), chronic renal failure (CRF) (p=0.000) and history of ischemic stroke (p=0.000). When laboratory data were analyzed, there were significant differences between patients who were discharged and patients who were excluded (p<0.05) (Table 1). Renal function test abnormality was significantly higher in those who were excluded (p=0.000, Chi-square: 201.107). In blood gas analysis, mortality rate was significantly higher in patients with metabolic acidosis (84.3%) and respiratory acidosis (72.3%) (p=0.000, Chi-square: 92.028). The duration of hospitalization was significantly higher in patients with exitus and was 14.93±12.25 days (p=0.000) (Table 1). There was a significant difference between the duration of hospitalization with increasing age (p=0.000, Chi-square: 300.920). In addition, the duration of ICU stay was significantly longer in patients with high serum lactate levels (p=0.000, Chi-square: 1703.515) and high CRP levels (p=0.000, Chi-square: 2,514.197). The presence of comorbid diseases had no effect on the length of ICU stay (p>0.05).

There were significant results in the comparison of diagnosis and gender (p=0.000, Chi-square: 72.373). According to the findings in Table 2, ACS, pneumonia, intracranial hemorrhage, multitrauma, congestive heart failure (CHF) and epileptic seizure were more common in the male gender. When the diagnoses were analyzed according to age ranges, significant differences were observed (p=0.000, Chi-square: 564.529) (Table 2). Accordingly, 65.7% of the patients were over 65 years of age and the highest rate of hospitalization was 41.8% in patients over 75 years of age. Suicide attempt cases were more common in the age range of 18-24 years. There was a significant difference between diagnosis and length of hospitalization (p=0.000, Chi-square: 339.081) (Table 2). 79.1% of the patients were hospitalized in the ICU for 0-10 days, and the patient group with the shortest hospitalization period was ACS with an average of 5.27±3.22 days. Long-term hospitalizations (>30 days) were more common in patients with ARF, sepsis and multitrauma. When the distribution of discharged and excluded patients according to diagnoses was analyzed, significant results were found (p=0.000, Chi-square: 745.652) (Table 2). The discharge rate of patients hospitalized with ACS was 92.8%, while the exitus rate of patients hospitalized with ischemic stroke was 88.7%. The diagnoses with a higher discharge rate than the exclusion rate were ACS and suicide attempt. The mortality rate seen in the study was 47.6%, while the mortality rate of patients other than ACS, the most common patient group, was 43.8%.

Discussion

ICUs are the units with the highest mortality rate in hospitals [2]. In our study, the in-hospital mortality rate of patients hospitalized from the emergency department to the ICU was 47.6%. In the literature, although the mortality rate in the ICU is generally in the range of 30-40% in studies conducted in our country, there are studies reporting a mortality rate in the range of 22.4-60.4% [3,5,7-11]. In studies conducted in different countries, ICU mortality rates were reported to be between 31.4-44.4% [12-14]. In a study conducted in Singapore, although the annual number of deaths in the ICU was approximately 500.000, the mortality rate was found to be lower than in other studies (8-19%) [2]. Although the mortality rate in our study was similar to the studies conducted in our country, the closest value was the mortality rate (46.7%) in the study conducted by Colpan et al. in Ankara [11]. We think that the variable mortality rates may be due to the difference in the centers where the studies were performed and the factors evaluated within the scope of the study.

The majority of patients followed up in the ICU consist of elderly patients. Studies have reported that these patients are generally more complicated patients and mortality is higher in this age group [1,15]. In many similar studies on the subject, it has been reported that age is one of the most important factors affecting mortality [5-8,16-20]. In the study conducted by Avınca et al. the mean age of

Table 1. General evaluation of demographic data and comparison of discharged and excluded patients.

Datas	Total** (n/%/SD)	Discharged** (n/%/SD)	Exitus** (n/%/SD)	Statistical Value**
Number of Patients	1.245 (100)	652 (52.4)	593 (47.6)	
Gender				
Male	746 (59.9)	444 (59.5)	302 (40.5)	
Female	499 (40.1)	208 (41.7)	291 (58.3)	p=0.000. Chi-square: 38.125
Age	69.23±15.97	63.72±15.20	75.28±14.56	p=0.000
Application Time				
08.00-15.59	593 (47.6)	322 (54.3)	271 (45.7)	
16.00-23.59	453 (36.4)	223 (49.2)	230 (50.8)	p=0.242. Chi-square: 2.835
24.00-07.59	199 (16)	107 (54.4)	92 (47.6)	
Weekday hospitalization	930 (74.7)	477 (51.3)	453 (48.7)	
Weekend hospitalization	315 (25.3)	175 (55.6)	140 (45.4)	p=0.107. Chi-square: 1.716
Comorbid Disease				
Hypertension	542 (43.5)	251 (46.3)	291 (53.7)	p=0.000. Chi-square: 14.129
Diabetes Mellitus	297 (23.9)	150 (50.5)	147 (49.5)	p=0.465. Chi-square: 0.544
Coronary Artery Disease	261 (21)	138 (52.9)	123 (47.1)	p=0.889. Chi-square: 0.034
Chronic Obstructive Pulmonary Disease	112 (9)	40 (35.7)	72 (64.3)	p=0.000. Chi-square: 13.687
Chronic Renal Failure	81 (6.5)	17 (21)	64 (79)	p=0.000. Chi-square: 34.205
Stroke	47 (3.8)	14 (29.8)	33 (70.2)	p=0.001. Chi-square: 9.986
Previous surgery	39 (3.1)	23 (59)	16 (41)	p=0.401. Chi-square: 0.704
Laboratory				
RFT disorder	491 (39.4)	135 (27.5)	356 (72.5)	p=0.000. Chi-square: 201.107
LFT disorder	119 (9.6)	32 (24.9)	87 (73.1)	p=0.000. Chi-square: 34.243
Electrolyte disturbance	89 (7.1)	20 (22.5)	69 (77.5)	p=0.001. Chi-square: 9.986
White blood cell (10^3/mm^3)	11.84 (8.14-13.55)	10.81 (8.05-12.6)	12.73 (8.15-15.19)	p=0.000
Hemoglobin (g/dL)	13.20 (11.6-15)	13.96 (12.6-15.4)	12.44 (10.7-14.38)	p=0.000
Platelets (10^3/mm^3)	248.07 (183-299)	260.53 (204-302)	234.7 (154-295)	p=0.000
C-reactive protein (mg/L)	85.36 (3.6-80.15)	51.67 (2.3-17.07)	95.8 (13.9-151.3)	p=0.000
Lactate (mmol/L)	3.18 (0.98-3.01)	2.35 (0.58-2.31)	3.80 (1.81-4.16)	p=0.000
Blood Gas Analysis				
Normal	1054 (84.7)	612 (58.1)	442 (41.9)	
Metabolic acidosis	108 (8.7)	17 (15.7)	91 (84.3)	p=0.000. Chi-square: 92.028
Respiratory acidosis	83 (6.7)	23 (27.7)	60 (72.3)	
Length of hospitalization (days)**	7.80 (1-120)	3.76 (1-86)	12.25 (1-120)	p=0.000

*RFT: Renal function test, LFT: Liver function test **Categorical data were compared using the Pearson Chi-square (χ^2) test and Fisher's exact test. Parametric data were compared using the Independent Groups T-Test, and non-parametric data were compared using the Mann Whitney U Test and p<0.05 was accepted as significant. Data are expressed as mean ± standard deviation, median (1^{st} quarter-3^{rd} quarter) and n (%). Patient hospitalization durations are expressed as mean and minimum and maximum values.

the patients discharged from the ICU was 71, while the mean age of the patients who were excluded was 78 and a significant difference was observed between the two groups (p<0.001) [8]. Chung et al. In their study on the length of hospitalization and mortality of patients hospitalized in the ICU in South Korea, they reported that the length of hospitalization increased significantly with increasing age (p<0.001). In the same study, they drew attention to the fact that the age factor did not affect mortality in the acute period of the disease, but the treatment process of patients over 65 years of age was longer and the risk of mortality increased in the chronic period [21]. In our study, the mean age of the patients who were discharged from the ICU was 63.72±15.20, while the mean age of the patients who were excluded was 75.28±14.56 and a significant difference was observed between the two groups (p=0.000). In addition, 65.7% of the patients hospitalized in the ICU were over 65 years of age. In our study, similar to the studies in the literature, we would like to emphasize that the age factor is effective in ICU hospitalizations, affects the length of stay and is significant on mortality.

In our study, we observed that the mortality rate (58.3%) was higher in women. In the study by Cakır et al. mortality was higher in female gender [7]. Similarly, Kollef et al. reported female gender as a factor affecting mortality [16].

Table 2. Comparison of diagnosis with demographic data and outcomes.

Diagnosis	Gender (n/%)		Age Range (n/%)							Length of Hospitalization (days) (n/%)				Result (n/%)	
	Female	Male	18-24	25-34	35-44	45-54	55-64	65-74	>75	0-10	10-20	20-30	>30	Discharged	Exitus
Acute Coronary Syndrome	173	396	4	5	29	85	141	177	177	553	10	2	4	528	41
	(30.4)	(69.6)	(0.7)	(0.9)	(5.1)	(14.9)	(24.8)	(31.1)	(31.1)	(97.2)	(1.8)	(0.4)	(0.7)	(92.8)	(7.2)
Pneumonia	112	169	3	5	0	11	46	48	168	155	62	32	32	41	240
	(39.9)	(60.1)	(1.1)	(1.8)	(0)	(3.9)	(16.4)	(17.1)	(59.8)	(55.2)	(22.1)	(11.4)	(11.4)	(14.6)	(85.4)
Acute Renal Failure	56	43	1	0	0	3	12	18	65	80	16	1	2	3	6
	(56.6)	(43.4)	(1.0)	(0)	(0)	(3.0)	(12.1)	(18.2)	(65.7)	(80.8)	(16.2)	(1.0)	(2.0)	(33.3)	(66.7)
Ischemic Stroke	39	32	0	1	1	5	4	14	46	39	13	10	9	8	63
	(54.9)	(45.1)	(0)	(1.4)	(1.4)	(7)	(5.6)	(19.7)	(64.8)	(54.9)	(18.3)	(14.1)	(12.7)	(11.3)	(88.7)
Sepsis	22	17	0	2	0	4	1	8	24	20	13	1	5	8	31
	(56.5)	(43.5)	(0)	(5.1)	(0)	(10.3)	(2.6)	(20.6)	(61.4)	(51.3)	(33.3)	(2.6)	(12.8)	(20.5)	(79.5)
Multitrauma	17	19	1	4	4	2	5	3	17	25	8	1	2	14	22
	(47.2)	(52.8)	(2.8)	(11.1)	(11.1)	(5.6)	(13.9)	(8.3)	(47.2)	(69.4)	(22.2)	(2.8)	(5.6)	(38.9)	(61.1)
Intracranial Hemorrhage	8	15	5	2	2	0	2	4	8	16	3	1	3	4	19
	(34.8)	(65.2)	(21.7)	(8.7)	(8.7)	(0)	(8.7)	(17.4)	(34.8)	(69.6)	(13)	(4.3)	(13)	(17.4)	(82.6)
Hepatobiliary Disease	12	11	0	0	0	0	8	7	8	17	2	2	2	3	20
	(52.2)	(47.8)	(0)	(0)	(0)	(0)	(34.8)	(30.4)	(34.8)	(73.9)	(8.7)	(8.7)	(8.7)	(13)	(87)
Gastrointestinal Hemorrhage	15	7	0	0	1	0	2	6	13	14	5	2	1	5	17
	(68.2)	(31.8)	(0)	(0)	(4.5)	(0)	(9.1)	(27.3)	(59.1)	(63.6)	(22.7)	(9.1)	(4.5)	(22.7)	(77.3)
Suicid Attempt	11	8	5	6	3	2	0	1	2	19	0	0	0	16	3
	(57.9)	(42.1)	(26.3)	(31.6)	(15.8)	(10.5)	(0)	(5.3)	(10.5)	(100)	(0)	(0)	(0)	(84.2)	(15.8)
Pleural Effusion / Empyema	8	4	0	0	0	0	2	2	8	6	5	1	0	0	12
	(66.7)	(33.3)	(0)	(0)	(0)	(0)	(16.7)	(16.7)	(66.7)	(50)	(41.7)	(8.3)	(0)	(0)	(100)
Congestive Heart Failure	5	7	0	0	0	1	1	2	8	9	2	1	0	6	6
	(41.7)	(58.3)	(0)	(0)	(0)	(8.3)	(8.3)	(16.7)	(66.7)	(75)	(16.7)	(8.3)	(0)	(50)	(50)
Pulmonary Embolism	5	4	0	1	0	0	0	2	6	7	1	1	0	3	6
	(55.6)	(44.4)	(0)	(11.1)	(0)	(0)	(0)	(22.2)	(66.7)	(77.8)	(11.1)	(11.1)	(0)	(33.3)	(66.7)
Electrolyte Disorder*	5	4	0	0	0	0	0	2	7	6	3	0	0	3	6
	(55.6)	(44.4)	(0)	(0)	(0)	(0)	(0)	(22.2)	(77.8)	(66.7)	(33.3)	(0)	(0)	(33.3)	(66.7)
Diabetic Ketoacidosis	4	2	1	0	0	0	0	1	4	4	2	0	0	1	5
	(66.7)	(33.3)	(16.7)	(0)	(0)	(0)	(0)	(16.7)	(66.7)	(66.7)	(33.3)	(0)	(0)	(16.7)	(83.3)
Ileus	4	2	0	0	0	0	0	2	4	6	0	0	0	1	5
	(66.7)	(33.3)	(0)	(0)	(0)	(0)	(0)	(33.3)	(66.7)	(100)	(0)	(0)	(0)	(16.7)	(83.3)
Epileptic Seizure	0	5	0	2	0	0	2	0	1	5	0	0	0	3	2
	(0)	(100)	(0)	(40)	(0)	(0)	(40)	(0)	(20)	(100)	(0)	(0)	(0)	(60)	(40)
Aortic Dissection	2	1	0	0	0	0	1	0	2	3	0	0	0	0	3
	(66.7)	(33.3)	(0)	(0)	(0)	(0)	(33.3)	(0)	(66.7)	(100)	(0)	(0)	(0)	(0)	(100)
Mesenteric Ischemia	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1
	(100)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(100)	(100)	(0)	(0)	(0)	(0)	(100)
Total	499	746	20	28	40	113	227	297	520	985	142	58	60	652	593
	(40.1)	(59.9)	(1.6)	(2.2)	(3.2)	(9.1)	(18.2)	(23.9)	(41.8)	(79.1)	(11.4)	(4.7)	(4.8)	(52.4)	(47.6)
Statistical Analysis**	p=0.000				p=0.000						p=0.000			p=0.000	
	Chi Square: 72.373				Chi Square: 564.529						Chi Square: 339.081			Chi Square: 745.652	

*Multitrauma: Patients with multiple organ or tissue injuries. Electrolyte Disorder: Patients with any of Hyponatremia. Hypernatremia. Hyperkalemia and Hypokalemia ** The data in the table consists of the number of patients (n) and percentage rate (%). Categorical data were compared using the Pearson Chi-square (χ^2) test and Fisher's exact test p<0.05 was accepted as significant.

In a meta-analysis study by Modra et al. on gender differences in terms of disease severity and mortality among adult ICU patients, it was reported that female gender had higher disease severity scores than males during ICU hospitalization and were more fatal than males in the first year after discharge [22]. There are also studies showing that gender has no significant effect on mortality [5,8].

There are controversies about the importance of the presence of comorbid diseases in patients hospitalized in ICU. According to one study, the presence of comorbid diseases is an important factor that should be taken into consideration in ICU hospitalization in patients hospitalized for critical diseases because of its effect on mortality [19]. In another study, it was reported in the literature that the presence of comorbid disease alone did not affect mortality and that age, gender and primary disease status should be evaluated together [7]. In studies conducted in the literature, it has been emphasized that mortality increases depending on the presence of comorbid diseases and age factor [6,17,18,23,24]. In our study, mortality was found

to be significantly higher in patients with a history of HT, COPD, CRF and stroke. However, we found no significant difference in mortality in patients with DM, CAD and previous surgery. In the study by Akkoc et al. the presence of previous surgery was found to be significantly higher in patients who were excluded ($p<0.001$) [5]. In another study, the mortality rate was found to be higher in patients with DM and ARF, whereas there was no significant difference in mortality in patients with CAD, previous stroke and COPD [8]. In conclusion, according to the data in the literature and our study, it is difficult to state that mortality is higher in patients with comorbid diseases. We would like to state that more specific and large-scale studies on the subject are needed.

We think that laboratory data of patients followed up in ICU are also effective in predicting mortality. In our study, when the values given in Table 1 were analyzed, it was seen that there were significant differences in the laboratory data of discharged and excluded patients ($p<0.05$). Chronic or acute renal failure increases mortality in patients hospitalized in ICU. Acute renal failure progresses rapidly and is fatal with the triggering of conditions such as acute fluid loss, sepsis and rhabdomyolysis [25]. In the study conducted by Avınca et al. mortality was higher in patients with high blood urea values [8]. In a similar study by Akkoc et al. renal function tests were found to be significantly impaired in patients who were excluded. In addition, similar to our study, hemoglobin and platelet values were significantly lower ($p<0.001$) [5]. In a study conducted with patients who were followed up in ICU due to respiratory diseases, it was reported that elevated blood urea and low albumin levels were associated with mortality [3]. In a recent study by Aydın et al. it was observed that low blood albumin and high blood lactate levels were effective on mortality [26]. In many studies conducted in the literature, it has been shown that mortality rate is higher in patients with a blood lactate level above 2 mmol/L at the time of admission [27,28]. Lee et al. reported that there was no significant relationship between lactate level and mortality [29]. In our study, the mean lactate level of the patients who were excluded at the time of admission was 3.80 ± 3.57 mmol/L and was found to be significantly higher. C-reactive protein may increase in the presence of malignancy, infection, sepsis, obesity, smoking and chronic systemic disease [30]. According to a meta-analysis study, CRP was found to be associated with the presence of atherosclerotic disease and recurrent cardiovascular events in patients with cardiovascular disease and was found to be an independent risk factor for mortality [31]. In studies, it has been reported that increased CRP level increases endothelial dysfunction and increases cardiovascular events and mortality [32-34]. In a study by Avınca et al., it was reported that there was a significant correlation between elevated CRP level in the blood and mortality [8]. In our study, similar to the literature data, it was observed that patients with high CRP level evaluated at the time of presentation to the emergency department had a more fatal course.

In our study, we found that the most common reasons for ICU hospitalization were ACS, pneumonia and ARF. In the study by Akkoc et al. the most frequent hospitalizations were due to neurological diseases (16.9%) and respiratory system diseases (9.5%) [5]. According to some studies, it was observed that the number of patients hospitalized in the ICU for cardiovascular reasons ranked first [8,35,36]. In the study by Cakır et al. the most common indication for hospitalization was for diseases originating from the neurological system (27.6%) [7]. In a similar study by Aydın et al. the most common indications for hospitalization were stroke (19%) and pneumonia (17.3%) [26]. The data of our study were similar to some studies in the literature. However, we think that there may be differences according to the centers where the studies were conducted and the scope of the studies. In our study, all ICUs operating in the first, second and third level and where patients were hospitalized were included in the study. Therefore, we would like to state that the number of patients diagnosed with ACS was significantly higher. In addition, since the COVID-19 pandemic was ongoing during the period of our study, the number of patient hospitalizations due to pneumonia was quite high.

There are many factors affecting the length of ICU stay of patients. In this study, we found that advanced age, elevated serum lactate and CRP significantly affected the length of ICU stay ($p<0.05$). In our study, the mean length of ICU stay of the excluded patients was 14.93 ± 12.25 days, which was significantly higher than that of the discharged patients. In the study by Akkoc et al. the mean length of ICU stay of the patients who were exited was 17.7 ± 33.4 days and this difference was found to be statistically significant ($p<0.001$) [5]. In the study by Aydın et al. mortality rate was found to be statistically significantly higher in patients with longer ICU stay ($p<0.001$) [26]. In the literature, it has been shown that mortality rate increases in ICU hospitalizations of two weeks or more [23,37]. In our study, we found that the length of hospitalization was significantly different according to the diagnoses ($p=0.000$). We would like to emphasize that patients hospitalized with ACS (97.2%) were hospitalized for 0-10 days and patients hospitalized with multitrauma, intracranial hemorrhage, ARF and sepsis were hospitalized for more than 30 days compared to other diagnoses.

Some of the patients hospitalized in intensive care do not benefit from the treatments received here, and mortality is predicted to increase in such patients. In the United States of America, such patients die by providing palliative support in the patient's home, inpatient wards and chronic care units. In our country, the place of death is usually ICUs due to the limited availability of alternative places of care. This situation increases unnecessary patient hospitalization in ICUs and prevents the hospitalization of patients who will benefit [1]. Therefore, we would like to emphasize that palliative care centers should be increased and ICUs should be used for the treatment of patients who will benefit.

Nowadays, the importance of intensive care services is increasing especially in developing countries as it is in our country. The main elements of intensive care are patients with severe general condition, high technological and expensive equipment and intensive care workers. The professionalism of intensive care workers and the improvement of their working conditions are important in terms of pa-

tient care. Studies have shown that costs and the risk of patient mortality decrease in units with full-time intensive care specialists [38,39]. We would like to state that in recent years, more importance has been given to intensive care subspecialization in our country and the number of intensive care specialists in ICU has started to increase day by day. On the other hand, the professionalism of the nurse team working in the ICU increases the quality of patient care and is effective in reducing mortality. For this reason, nurses with special goals and skills work at a fast and intense pace in the ICU [40]. Since nurses working with high motivation are needed in intensive care units, organizing working conditions will positively affect patient care, safety and service quality. Managers should reveal the current situation for institutions, review the duties-authorities and responsibilities of nurses within the framework of laws and institutional rules, encourage nurses to participate in scientific activities, training programs and membership to professional organizations, and make the necessary changes related to the care team in ICU [40].

Conclusion

In conclusion, although there are many factors affecting the mortality of patients hospitalized in ICU, we found that there were significant differences between discharged and excluded patients in the majority of the data we analyzed in our study.Predicting the mortality of patients hospitalized in intensive care, determining the severity of the disease, determining the factors affecting the mortality and length of hospitalization are important in terms of developing new treatment methods.We also think that inadequate treatment and care and non-compliance with sterilization rules are among the factors affecting mortality.We anticipate that mortality will decrease with stricter measures and more devoted work in ICUs.We think that increasing the number of intensive care subspecialists working in intensive care and increasing the number of nurses working in intensive care will also be beneficial in reducing mortality.

Ethical approval

Ethical approval was received for this study from Hacıbektaş Veli University Non-Interventional Clinical Research Ethics Committee (date: 21/07/2023 decision no: 2023/06).

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