Analysis of Patients Discharged as Exitus from Intensive Care Unit: One Year Data of a Tertiary Health Institution

Yoğun Bakım Ünitesinde Exitus Gerçekleşen Hastaların Analizi: Üçüncü Basamak Merkezin Bir Yıllık Verileri

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ÖZ

Amaç: Hastanemiz Yoğun Bakım Ünitesi'ne (YBÜ) 1 Mayıs 2017- 31 Mayıs 2018 tarihleri arasında kabul edilen ve exitus gerçekleşen hastaların demografik verilerini, YBÜ kabul nedeni ve kalış süresi ile exitus nedenlerini tespit etmektir.

Araçlar ve Yöntem: Kurum izni ve etik kurul izni alındıktan sonra hastanemizin YBÜ'ne kabul edilmiş olan ve exitus gerçekleşen hastaların tıbbi kayıtları geriye dönük olarak incelenmiştir. Çalışmada 434 hastanın verileri analiz edilmiştir. Hastaların yaş ve cinsiyetleri, yoğun bakıma yatış saatleri ve mesai dilimi, exitus kabul edildiği saat, hangi servis adına yatış yapıldığı, yatış endikasyonları, YBÜ'de kalış süreleri ve primerexitus nedenleri kaydedilmiştir.

Bulgular: 1 Mayıs 2017 – 31 Mayıs 2018 arasında YBÜ'ne toplam1331 hasta kabul edilmiş ve bu hastaların 434'ünde (%32.6) exitus gerçekleşmiştir. Hastaların yaş ortalaması 72.82 ± 15.81 idi. En sık ölümler 139 hasta ile (%32) 80 – 89 yaş aralığında tespit edildi. Exitus olan hastaların 201'i kadın (%46), 233'ü erkekti (%54). Hastaların YBÜ'ne en sık kabul edildiği saatler 13:00 ve 15:00 aralığındaydı. Rapor edilen en sık exitus nedeni kardiyovasküler hastalıklar (n =222, %51.2) iken hastaların bağlı olduğu klinik en sık olarak (n = 105, %24.2) Göğüs Hastalıkları Kliniği'ydi. Hastaların %93.8'i hastaneye Acil Servis'ten giriş yapmış ve %6.2'si hastane içi servislerden YBÜ'ne nakledilmiştir. Hastaların ortalama GKS skoru 8.4 ± 4.6.Hastalara ait tıbbi kayıtlardan APACHE II skorları ve SOFA skorlarına ulaşılamamıştır.

Sonuç: Yoğun bakım ünitemizde mortalite oranları diğer birçok merkezden düşük olmakla beraber hala yüksektir. İleri yaş ve komorbid hastalıkların varlığı bu sonuçlar üzerinde etkili olabilir.

Anahtar Kelimeler: Epidemiyoloji, istatistik, mortalite, yoğun bakım ünitesi

ABSTRACT

Purpose: To determine the demographic data, length of stay at intensive care unit (ICU), diagnosis at ICU admission and the cause of death in patients hospitalized in ICU from 1 May, 2017 to 31 May, 2018 at the end of their lives.

Materials and Methods: Medical files of 434 patients who stayed in ICU and discharged as exitus were retrospectively analyzed. Age, gender, the time of ICU admission and declaration of death (time, work period, and month), the department responsible for patient care, indication for ICU admission, length of stay in ICU, and primary cause of death of the patients were recorded.

Results: Total number of ICU admissions in the study period was 1331 patients and 434 (32.6%) of them died. Mean age of patients was 72.82 ± 15.81. The incidence of death was most frequent between 80 – 89 years of age (n=139, %32). 201 of the patients were female (46%) and 233 were male (54%). Patients were most frequently admitted to ICU between 13:00 – 15:00 time period. Most frequent cause of death was cardiovascular diseases (n=222, 51.2%) although chest diseases was the most common department admitting patients to ICU (n=105, 24.2%). Ninety-three point eight percent of the patients admitted to hospital from emergency department and 6.2% were transferred from wards. Mean GKS of the patients was 8.4 ± 4.6. We could not reach the data of APACHE II Scores and SOFA Scores from the medical fields of the patients.

Conclusion: Although mortality rates in our ICU are lower than other institutions, it is still high. Increased age and the presence of comorbidities may play a role in this outcome.

Key Words: Epidemiology, intensive care unit, mortality, statistics

INTRODUCTION

Intensive care units (ICU) are specialized departments of hospitals where patients with life threatening diseases are admitted to, followed up, monitored and treated.[1,2] Besides advanced life support equipment, specialized health care personnel are needed for the management of patients hospitalized in ICU. Limits for "old age" was revised by World Health Organization (WHO) to 80-99 years of age and some authorities advocate that people older than 65 years of age have a long life expectancy therefore age should not be a limitation for ICU admissions.[3] On the other hand some investigators believe that age is a factor restricting ICU admissions and the treatment strategy in ICU.[3-5]

With the worldwide increasing elderly population, we are getting care of more elderly patients in Turkey, as well as in our institution. Increased age is complicated with increased comorbidities leading to increased need for ICU stay. Angus DC et al[6] reported that until year 2025, a growing and aging population will be demanding ICU care. The rate of elderly population increase is approximately three times more than the total increase of the general population. In Turkey, in 2012, 7.5% of the total population was above 65 years and this ratio increased to 8.3% in 2016.[7]

Under these circumstances, management of ICU is becoming more important to meet the increasing number of patients demanding ICU care. Up to date there was no epidemiologic study documenting the mortality rate and the medical data of patients discharged as exitus from ICU regarding our institution. This retrospective study was designed to determine the mortality rate of ICU in our institution as well as determining the medical data of patients that died during their ICU stay and to document epidemiologic data to advance the health care provided in ICU.

MATERIALS AND METHODS

Ethics and Patient Selection

After obtaining local institutional review board acceptance, Ahi Evran University Faculty of Medicine Clinical Researches Ethics Committee approved the study (2018-14/126). The study was conducted at the ICU of our institution from 1 May, 2017 to 31 May, 2018. The study was conducted in line with Declaration of Helsinki. The current study is retrospectively designed. Medical files of 1331 patients admitted to ICU during the study period were retrospectively analyzed. Of the 1331 patients admitted to ICU, 434

patients were discharged as exitus and these patients were selected for the study.

ICU data

Demographic data (age, gender), time of admission to ICU (hour, working period, month), time the patient was accepted exitus, primary diagnosis for ICU admission, the department responsible for the patient, the department that transported the patient to ICU, length of stay in ICU, causative diagnosis of death in ICU were recorded.

Statistical Analysis

The data were analyzed using IBM SPSS ver. 21.0 software (SPSS, Chicago, IL, USA). Normal distribution of data was analyzed with Kolmogorov-Smirnow test. Descriptive data were expressed as means ± standard deviation, median (interquartile range), numbers (n), and percentages as appropriate. Independent samples-t test was used to analyze intergroup comparison. p value < 0.05 was accepted as statistically significant difference.

RESULTS

A total of 1331 patients admitted to ICU of our institution from May 1, 2017 to May 31, 2018. Number of patients discharged in exitus state was 434 and the data of these patients were included in the study. Length of stay in ICU and the diagnosis at admission to ICU did not have a significant difference on the basis of gender (p = 0.123, p = 0. 373 respectively). Mean age of the patients was 72.8 ± 15.8 years (range 1 - 101 years of age), 201 were female (46.3%), and 233 were male (53.7%). Mean GKS of the patients was 8.4 ± 4.6. Majority of the patients were aged between 70 – 89 years (60.8%) (Table 1). Time of admission was most common (74 patients, 17%) between 13:00 - 15:00 hours (Table 2). Patients were most commonly discharged (78 patients, 18%) between 08:00 - 10:00 hours (Table 3). Length of stay in ICU is expressed in Table 4. Of the 434 patients, 73.5% (n = 319) admitted to ICU and discharged in exitus state stayed less than five days in ICU. Chest Diseases Clinic was the leading department hospitalizing 105 patients (24.2%) at ICU while anesthesiology and reanimation was the least with five (1.2%) patients (Table 5). Of the 434 patients, 93.8% (407 patients) were transferred directly from Emergency Department to ICU and 27 patients were transferred from other departments during their treatment course in the wards. The leading cause of exitus was related to cardiovascular diseases. A very

interesting result was that the causative diagnosis of death was reported as "sepsis" only in two patients (Table 6).

Table 1: Distribution of patients according to age group

Age	Frequency	Percentage
0-9	2	0.5
10-19	6	1.4
20-29	5	1.2
30-39	4	0.9
40-49	17	3.9
50-59	35	8.1
60-69	68	15.7
70-79	125	28.7
80-89	139	32.0
90-99	33	7.6
Total	434	100

DISCUSSION

In this retrospective study, data obtained from the medical fields of 434 patients admitted to ICU and discharged as exitus were analyzed. As the elderly patient population is increasing in our country, the need for ICU care is increasing tremendously. To meet for the increasing demand for ICU care, rational use of ICU beds must be planned. This can be achieved by analyzing the retrospective data of the ICU to illuminate further progression in patient care and decreasing the mortality rates. An epidemiologic dataset has not been documented regarding the patient mortality of ICU in our institution. This is the first epidemiologic study expressing the mortality rate for our institution.

Mean age of patients was 72.8 ± 15.8 years in the current study. The mean age of our study population was similar to the study reported by Unal et al[2] in 2015. But in that study mortality rate was 52.3% whereas the mortality rate in the current study is 32.6%. The reason for this difference may be the former study was conducted on medical ICU (hospitalizing only patients related to intensive care medicine) patients whereas our ICU is a general ICU accepting both medical and postoperative patients. Our results were also in accordance with the study reported by Seferian et al[8] which reported a mean age of 72.1 ± 16.0. They concluded that the rate of

ICU use at the end of life increases with increasing age and number of comorbidities. Sipahi et al[9] conducted a study in tertiary general intensive care unit and reported the mortality rate as 27.33%. The mortality rate in that study was lower than our results but their inclusion criteria was length of stay at ICU>1 days. And the postoperative patient population constituted 10.9% of all patient population. They did not accept patients from Emergency Department since they did not have emergency department. However in this study, 19.6% of patients were postoperative patients and 93.8% of our patients were transferred to ICU from Emergency Department. These two differences in patient admissions may constitute the basis for the difference in mortality rates between the two studies.

Most of the patient admissions occurred between 13:00 – 15:00 hours and most of the deaths occurred between 08:00 – 10:00 hours. Orban et al[10] have reported that 58% of patient deaths occurred during night shift and weekends. In the current study 36.9% of deaths occurred during the night shifts. The former study was a multicenter cohort study including 96 ICUs and one arm of the study was constituted from patients whose ICU care was withholded or withdrawn (which of both conditions are not legally permitted in our country). The difference between our results and that study may arise from the aforementioned arm of the former study since withdrawal or withholding of the treatment may be more frequent at night shifts and weekends when the number of stuff working in ICU is less compared to day time shifts.

In the current study mortality rate was 32.6% and 73.5% of patients died within the first five days of ICU admission. This result was in contrast to the results reported by Ceylan et al[11]. In that study they proposed that as the length of stay increases beyond 14 days, the risk of complications and therefore the rate of mortality increases. Probable explanation of the difference between the results of these two studies is that the current study was conducted in a general ICU however the former study was conducted at a medical ICU. Another reason may be the ICU acceptance criteria. Majority of the patients (93.8%) in our study were transferred from emergency room and most of the patients had more than one comorbidity, exacerbation of chronic obstructive pulmonary disease, and/or cardiovascular and neurologic disorders. Sociodemographic and cultural structure of the population may be another determinant of delaying admission of this patient population to hospital until they are at the end of their lives. Sipahi et al[9] have conducted their study similar to our ICU and reported a mortality rate of 27.33% which is 5% lower than our results however they did not accept patients

Table 2: Distribution of patients according to admission hour and admission time to intensive care unit

Admission Time Interval	Admission Hour	Frequency	Percentage	Percentage
00:00-07:59	00:00-00:59	9	2.1	**11.3**
	01:00-01:59	8	1.8	
	02:00-02:59	10	2.3	
	03:00-03-59	8	1.8	
	04:00-04:59	1	0.2	
	05:00-05:59	4	0.9	
	06:00-06:59	6	1.5	
	07:00-07:59	3	0.7	
08:00-15-59	08:00-08:59	11	2.5	**51.1**
	09:00-09:59	30	6.9	
	10:00-10:59	21	4.8	
	11:00-11:59	29	6.7	
	12:00-12:59	17	3.9	
	13:00-13:59	40	9.2	
	14:00-14:59	34	7.8	
	15:00-15:59	40	9.2	
16:00-23:59	16:00-16:59	23	5.3	**37.6**
	17:00-17:59	21	4.8	
	18:00-18:59	22	5.1	
	19:00-19:59	22	5.1	
	20:00-20:59	23	5.3	
	21:00-21:59	19	4.4	
	22:00-22:59	19	4.4	
	23:00-23:59	14	3.2	
Total		434	100.0	100.0

from Emergency Department and they included patients that stayed at ICU > 1 day. Patients transferred from Emergency Department and stayed in ICU ≤ 1 day were generally post resuscitation patients and they were responsible for the higher mortality rate in our ICU.

Table 3. Distribution of patients according to discharge hour and discharge time from intensive care unit

Discharge Time	Discharge Hour	Frequency	Percentage	Percentage
00:00-07:59	00:00-00:59	14	3.2	**18.7**
	01:00-01:59	14	3.2	
	02:00-02:59	12	2.8	
	03:00-03-59	10	2.3	
	04:00-04:59	11	2.5	
	05:00-05:59	6	1.4	
	06:00-06:59	8	1.8	
	07:00-07:59	6	1.4	
08:00-15-59	08:00-08:59	35	8.1	**44.4**
	09:00-09:59	43	9.9	
	10:00-10:59	27	6.2	
	11:00-11:59	14	3.2	
	12:00-12:59	11	2.5	
	13:00-13:59	18	4.1	
	14:00-14:59	23	5.3	
	15:00-15:59	22	5.1	
16:00-23:59	16:00-16:59	25	5.8	**36.9**
	17:00-17:59	20	4.6	
	18:00-18:59	20	4.6	
	19:00-19:59	15	3.5	
	20:00-20:59	12	2.8	
	21:00-21:59	20	4.6	
	22:00-22:59	24	5.5	
	23:00-23:59	24	5.5	
Total		434	100.0	100.0

Patients most frequently admitted to ICU in May. Considering 24.2% of patients admitted to ICU were the patients of chest diseases and exacerbations of chronic obstructive pulmonary diseases (COPD) coincides with the same period, this was an expected result. Uysal et al[12] reported that 30% of ICU admissions were due to respiratory diseases and our results were in accordance with this study results. The major cause of death was due to cardiovascular diseases (51.2%) in the current study. This was in contrast to results reported by Uysal et al[12] According to National Center for Health Sciences, the annual incidence of sepsis in the USA increases with a rate of 7-8% per year and sepsis related mortality accounts for 24.3%.[13] The Turkish Intensive Care Association reported the approximate sepsis related death as 60% related to the severity of accompanying diseases

Table 4. Distribution of patients according to length of stay at intensive care unit

Days	Frequency	Percentage
1 – 5 days	319	73.5
6 – 10 days	65	15.0
11 – 15 days	21	4.8
16 – 20 days	12	2.8
21 – 25 days	8	1.8
26 – 30 days	4	0.9
>30 days	5	1.2
Total	434	100

Table 5. Departments hospitalizing patients at intensive care unit

Patient Population	Department	Frequency	Percentage
Postoperative Patients	Orthopedics	13	3.0
	General Surgery	20	4.6
	Neurosurgery	29	6.7
	Urology	18	4.1
	Anesthesiology	5	1.2
Medical Patients	Gastroenterology	16	3.7
	Neurology	77	17.8
	Cardiology	53	12.2
	Chest Diseases	105	24.2
	Nephrology	21	4.8
	Internal Medicine	66	15.2
	Others	11	2.5
Total		434	100

Although sepsis is the leading cause of death in the current century, the cause of death was reported sepsis only for two patients in the current study. This result may have multifactorial explanations. First the health care team working at ICU has inadequate knowledge of defining sepsis. We should increase the number of in-hospital educations on sepsis. Second, medical fields of the patients were not recorded properly by the health care personnel but it was rather recorded by the ICU ward secretary. We should emphasize the importance of documentation of medical fields of the patients by health care providers. Third the infectious diseases department may be misdiagnosing the patients with sepsis. Multidisciplinary consultations are essential for proper management of patients with sepsis.

Cardiovascular diseases were the leading primary disease for ICU admission. Accompanying diseases were serebrovascular diseases, pneumonia, chronic obstructive pulmonary diseases, chronic renal failure and acute renal failure respectively. Of the 434 patients, we could declare two brain deaths and one of these patients was a donor for bilateral kidneys and liver. Unfortunately heart and lungs were not suitable for donation.

Majority (93.8%) of patient admissions to ICU were from emergency department in the current study. This ratio was 41% in the study reported by Uysal et al[12] and 44.1% in the study by Akkoç et al[14]. Our study have shown that patient admission from emergency department to ICU is more than two folds of the former studies. The probable explanation of this difference is that the people taking care of these patients do not admit them to hospital until they are at the end of their lives. This result is also reinforced with the relative short duration of ICU stay in our study for 73.5% of patients having length of ICU stay between one to five days.

There were some limitations of the current study. Since this was the first epidemiologic study conducted at the ICU of our institution, we did not have previous results to compare with the results of the current study. The current study was retrospectively designed and we could not reach the APACHE II scores, and the SOFA scores of our patients. This was the main limitation of the current study but this study will be a cornerstone for proper documentation of medical fields of the patients by health care providers in this intensive care unit. This study warned us about the lacking and unhealthy documentation of patient medical fields in our ICU and illuminated us about our faults.

In conclusion, we reported an epidemiologic data for the ICU in our institution which may serve for the upcoming epidemiologic studies. Although mortality rates in our ICU are lower than other institutions, it is still high. Increased age and the presence of comorbidities may play a role in this outcome. Governmental precaution should focus on increasing the number of ICU beds to meet the increasing need for ICU care with the increasing elderly patient population in our country. Frequency of in-service education programs should be increased to increase the quality of patient care in ICU.

CONFLICTS OF INTEREST

The author declares that he has no conflicts of interest.

REFERENCES

1. Brilli RJ, Spevetz A, Branson RD et al. Critical care delivery in the intensive care unit: defining clinical roles and the best practice model. Crit CareMed 2001;29(10):2007-2019.
2. Unal AU, Kostek O, Takir M, Caklili O, Uzunlulu M, Oguz A. Prognosis of patients in a medical intensive care unit. North Clin Istanb 2015; 2(3):189-195.
3. Boumendil A, Somme D, Garrouste-Orgeas M, Guidet B. Should elderly patients be admitted to the intensive care unit? Intensive Care Med 2007;33(7):1252.
4. Boumendil A, Aegerter P, Guidet B, Network CU-R. Treatment intensity and outcome of patients aged 80 and older in intensive care units: a multicenter matched-cohort study. J Am Geriatr Soc 2005;53(1):88-93.
5. Garrouste-Orgeas M, Timsit JF, Montuclard L et al. Decision-making process, outcome, and 1-year quality of life of octogenarians referred for intensive care unit admission. ıntensive Care Med 2006;32(7):1045-1051.
6. Angus DC, Kelley MA, Schmitz RJ et al. Caring for the critically ill patient. Current and projected workforce requirements for care of the critically ill and patients with pulmonary disease: can we meet the requirements of an aging population? JAMA 2000;284(21):2762-2070.
7. Çiğdem ST, Fatih K. Dünya ve Türkiyede Yaşlılık. IBAD 2018;3(1):219-2029.
8. Seferian EG, Afessa B. Adult intensive care unit use at the end of life: a population-based study. Mayo Clin Proc 2006;81(7):896-901.
9. Sipahi M, Bolat E, Kantekin ÜÇ, Öztürk SA, Arslan E, Ercan U. Üçüncü seviye yoğun bakım ünitesinin ilk yıl değerlendirmesi. Bozok Tıp Derg 2014;4(2):41-44.
10. Orban JC, Walrave Y, Mongardon N, et al. Cause and characteristics of death in intensive care units: a prospective multicenter study. Anesthesiology. 2017;126(5):882-889.
11. Ceylan E, İtil O, Arı G, Ellidokuz H, Uçan ES, Akkoçlu A. İç hastalıkları yoğun bakım ünitesinde izlenmiş hastalarda mortalite ve morbiditeyi etkileyen faktörler. Toraks Dergisi. 2001;2(1):6-12.
12. Uysal N, Gündoğdu N, Börekçi Ş, ve ark. Üçüncü basamak merkezde dahili yoğun bakım hastalarının prognozu. Yoğun Bakım Derg. 2010; (1)1:1-5.
13. Hall MJ, Williams SN, DeFrances CJ, Golosinskiy A. Inpatient care for septicemia or sepsis: a challenge for patients and hospitals. NCHS Data Brief. 2011;42(62):1–8.
14. Akkoç İ, Yücetaş E, İşitmez İ, ve ark. Mortality rate in intensive care units of tertiary health institutions and identifying risk factors: analysis of 3945 patients. Bezmialem Science. 2017; 5(3):116-120.