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Original Article

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A Retrospective Analysis of Elderly Patients: Admitted Directly from the Emergency Department to the Intensive Care Unit for Medical Reasons

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Abstract

Objective: In the literature, the mortality rates have been reported to be higher in elderly patients admitted for medical reasons. We aimed to investigate the epidemiologic characteristics and clinical outcomes of these patients. ***Methods:*** In this study, records of medical patients aged ≥65 years admitted to ICU from ED, between Jan 2015-2018, were retrospectively reviewed. Demographic data, comorbidities, the main reason for the ICU admission, Acute Physical and Chronic Health Evaluation II (APACHE II) score, admission time of ED (Day time/ Off hours), and the transferred time to ICU were recorded. The following parameters were recorded: Requirement of mechanical ventilation (MV), duration of MV, requirement of vasopressors or renal replacement therapy (RRT), ICU Length of Stay, and ICU mortality. ***Results:*** A total of 134 patients were evaluated. The mean age of them was 77.56 ± 11.6 years. 43 patients were admitted during the day time. Most common reasons for ICU admission were respiratory failure and neurologic disorders. 63 patients died in the ICU. APACHE II score, requirement of MV, and vasopressors, ICU Length of Stay, and duration of MV were higher in nonsurvivors. However, transferred time was shorter in nonsurvivors. There was a negative correlation between mortality and transferred time, but a positive correlation was found with APACHE II score. ***Conclusions:*** The most interesting result of our study was that the transferred time of the nonsurvivors was shorter than the surviving patients. We think that this depends on the rapid admission of critical patients to the ICU, since ED in our hospital does not have the necessary technical equipment for the follow-up of these patients.

Keywords: ***Elderly patient; Intensive care unit; Mortality.***

Introduction

The number of elderly patients admitted to the emergency department (ED) is increasing day by day in our country as well as in the whole world. As a result of this, elderly patients constitute a significant proportion of patients acceptted to intensive care units (ICU). These patients need to be ICU follow-up due to acute exacerbations of existing chronic diseases or following a planned or urgent surgical procedure. The outcome of elderly patients varies depending on the reasons for ICU admission. In previous studies revealed that the mortality rates were higher in the patients admitted for medical reasons and in those admitted to ICU after unscheduled surgery (from 38% to 64%) [1-3].

Therefore, we aimed to evaluate elderly patients who were accepted to the ICU only for medical reasons. We thought that it may be more significative to evaluate elderly patients admitted directly to the ICU from the emergency department (ED). This research could be useful in terms of efficient use of ICU in our newly established hospital in a rural city.

Methods

After approval of the ethics committee (the Ethics and Research Committee of Karabuk University, No:77192459-050.99-E.1826), this single-center, retrospective study was conducted in the medical ICU at the Karabuk University Hospital in Karabuk, Turkey, from May 2014 to May 2015. The medical records of patients aged ≥ 65 years admitted from ED to the ICU were reviewed. Exclusion criteria were: patients who were transferred from the operating room, hospital ward or other hospitals; patients that stayed ≤24 hours; and patients with trauma. The ICU was a 22-bed medical closed unit, and was staffed by anaesthesiologyst on a 24 hours per days, 7 days a week basis.

We recorded demographic data (age, sex), comorbidities (cardiovascular, pulmonary, endocrinological, neurological, and gastrointestinal diseases), the main reason for the ICU admission (respiratory failure, neurologic disorders, postcardiac arrest, and gastrointestinal diseases), Acute Physiology and Chronic Health Evaluation (APACHE) II score, admission time of ED (Day time = 08.00-15.59 hours, off hours = 16.00-07.59 hours), and the time interval between admission to ED and acceptance to ICU (transferred time) were also recorded. The following parameters were recorded: Requirement of mechanical ventilation (MV),

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duration of MV, requirement of vasopressors or renal replacement therapy (RRT), ICU Length of Stay, and ICU mortality.

Statistical Methods

We used SPSS version 14.0 (SPSS Inc., Chicago, IL, USA) for the statistical analysis. Continuous variables of patients' baseline characteristics were reported as mean ± standard deviation, while between group (mortality vs. survival) comparisons were made using Student's t test. Categorical variables were reported as numbers and as percentages, whereas between group comparisons were made using the chi-square test and Fisher's exact test, as appropriate. Factors affecting mortality were evaluated by univariate analysis, and logistic regression analysis was used for the significant results. A P value <0.05 was considered significant for the analysis.

Results

Body During the study period, a total of 1364 patients were acceptted to the ICU. There were 223 elderly patients admitted from the ED to the ICU. A total of 89 patients were excluded due to: 35 trauma patients, 21 patients accepted for surgical reasons, 20 patients that stayed ≤24 hours, and 13 patients with missing data. Thus, 134 (9.82 %) patients were evaluated. The mean age of the patients was 77.56 ± 11.6 years, and 69 of them were female (n=69, 51.49 %). The mean APACHE II scores on ICU admission was 21.15 ± 7.2. Fifty-three (39.55 %) were admitted during the day time, and 81 (60.45 %) patients were admitted during off hours. Comorbid disease was present in 92.54 % of the patients. The most common comorbidities were cardiovascular disease, diabetes mellitus, neurological disease, and respiratory disease. Patient characteristics and comorbidities were shown in Table 1.

Most common reasons for ICU admission were respiratory failure (35, 26.12 %), neurologic disorders (31, 23.13 %), postcardiac arrest (26, 19.40 %) and intoxications (20, 14.92 %) (Table 2).

A total of 70 patients (52.24 %) required MV, and the mean MV duration was 4.51±2.9 days. 57 patients (42.54 %) received vasopressors treatment and 17 patients (12.69 %) underwent RRT. The mean duration of ICU stay was 5.66±5.5 days. A total of 63 patients (47.01 %) died in the ICU.

When we compared the survivors and nonsurvivors, we found that the APACHE II and Death Risk scores on ICU admission, requirement of MV, and vasopressors, ICU Length of Stay, and duration of MV were higher in nonsurvivors. The admission time of ED was similar for survivors and nonsurvivors. However, the time from arrival at the ED to ICU admission was shorter in nonsurvivors. (Table 3).

Since MV and vasopressor requirement, duration of MV, and ICU Length of Stay are highly consistent, these variables were not included in the model. There was a negative correlation between mortality and transferred time, but a positive correlation was found with APACHE II score.

Table 1: Patient characteristics.

Age (years), mean ± SD		77.56±11.6
Gender, N(%)	Female	69 (51.49)
	Male	65 (48.51)
APACHE II score, mean ± SD		21.15±7.2
Co-morbidities, N(%)		124 (92.54)
	Cardiovascular	104 (77.62)
	Diabetes mellitus	62 (46.27)
	Neurological	31 (23.13)
	Pulmonary	29 (21.65)
	Renal	12 (8.95)
	More than one Comorbidity	81 (60.45)
	None	10 (7.46)
ED admission time, N(%)	Day time	53 (39.55)
	Off hours	81 (60.45)

Definition of abbreviations: APACHE: acute physiology and chronic health evaluation; ED: emergency department; Day time: 08.00-15.59 hours, Off hours: 16.00-07.59 hours. Data are presented as mean ± SD or N (%).

Table 2: Main reason for ICU admission, N (%)

	Total (N=134)
Respiratory failure	35 (26.12)
Neurologic	31 (23.13)
Postcardiac arrest	26 (19.41)
Gastrointestinal	20 (14.92)
Intoxications	11 (8.21)
Acute coronary syndrome/congestive heart failure	7 (5.23)
Other	4 (2.98)

Table 3: Comparison of demographic and clinical data between patients survivors (N= 71) and nonsurvivors (N= 63).

		Survivors (n=71)	**Nonsurvivors (n=63)**	**P-value**
Age (years), mean ± SD		76.46±15.8	78.96±18.2	0.13
Sex, M/F (% male)		34/37	31/32	0.87
APACHE II, mean ± SD		18.22±8.1	24.48±8.5	<0.0001
Death Risk (%)		32.4	47.6	<0.0001
Admission time, N (%)	Day time	32 (45.07 %)	21 (33.33 %)	0.35
	Off hours	39 (54.93 %)	42 (66.67 %)	0.49

Transferred time (minutes), mean ± SD	79.75±16.5	56.56±11.7	<0.0001
ICU Length of Stay (days), mean ± SD	3.85±2.4	8.58±4.5	<0.0001
Requirement of MV, N (%)	10 (14.08 %)	60 (95.24 %)	<0.0001
Duration of MV (days), mean ± SD	1.34±2.5	9.72±3.1	<0.0001
Requirement of RRT, N (%)	5 (7.04 %)	12 (19.05 %)	0.06
Requirement of vasopressors, N (%)	3 (4.22 %)	54 (85.71 %)	<0.0001

*Definition of abbreviations: APACHE: acute physiology and chronic health evaluation; ICU: intensive care unit; ED: emergency department; RRT: renal replacement therapy; MV: mechanical ventilation. Data are presented as mean ± SD or N (%). *P-value <0.05 was considered significant*

Table 4: Effective factors on mortality in the multivariate logistic regression analysis.

Variables	B	P	OR	%95 Confidence Interval
Transferred time	-.042	0.015	0.959	0.927-0.992
APACHE II	.290	0.007	1.336	1.083-1.649

Discussion

In the literature, the mortality rate has been reported to be high for medical elderly patients. This rate was reported to be between 35-70 % [1-3]. Tabah *et al* [2] found that 1-year mortality was 80 % in medical patients. In the study, the ICU mortality rate was 47.01 %.

The effective factors on mortality in elderly patients have been reported in various studies [4,5]. Mechanical ventilation, vasopressors, and high APACHE II scores have been associated with mortality in literature [6-9].

Orsini *et al*.[10] found that critical illness, cardiopulmonary resuscitation, and needs for mechanical ventilation or vasopressor therapy are independent risk factors in mortality. Stein *et al*.[6] found the need for MV as an independent determinant of mortality [1]. Ip *et al*.[8] also found MV as a poor prognostic indicator. van den Noortgate *et al*.[9] found MV as a factor associated with mortality but on multivariate analysis, they could not attribute MV as an independent predictor of mortality in elderly patients. Similar to these results, this investigation revealed that nonsurvivors had higher APACHE II score, requirement of MV, and vasopressors.

We found a positive correlation between APACHE II score and mortality rate. However, there was a negative correlation with transferred time. We believe that it is due to the rapid transfer of critical patients to the ICU because our hospital does not have the necessary systems in the ED.

This was a single-centre and retrospective study. The long-term outcome of patients could not be assessed because of nature of the study. We cannot generalise our findings, because ICU management can be different in each hospital.

Conclusion

The most interesting result of our study was that the transferred time of the nonsurvivors was shorter than the surviving patients. We think that this depends on the rapid admission of critical patients to the ICU, since ED in our hospital does not have the necessary technical equipment for the follow-up of these patients.

Declarations

Financial Support and Conflicts of Interests

This report received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interests

The author has no competing interests to declare regarding the publication of this paper.

Contributor

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