RESEARCH

DO SURGICAL PATIENTS OLDER THAN 90 YEARS MORE BENEFIT FROM INTENSIVE CARE UNIT?

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Abstract

Introduction: The number of elderly patients followed in intensive care units is increasing day by day. In the literature, there are a limited number of studies covering patients aged 90 and over. We aimed to investigate the epidemiologic characteristics and clinical outcomes of elderly patients aged ≥90 years admitted to intensive care unit.

Materials and Methods: In this study, medical records of patients aged ≥90 years admitted to intensive care unit, between January 2015 and January 2018, were retrospectively reviewed. Demographic data, reason for admission (medical or surgical), Acute Physical and Chronic Health Evaluation II (APACHE II) score, need for and duration of mechanical ventilation, need for inotropic agents, duration of intensive care unit stay, and mortality rate were recorded.

Results: A total of 107 nonagenarians were evaluated. The mean age of the patients was 92.65 ± 2.36 years, and 72 of them were women. The mean score of APHACHE II was 23.6 ± 7.2. Most patients were admitted due to medical reasons (n = 82, 76.63%). Sixty-four of the medical patients, and four of the surgical patients had died in the intensive care unit (n = 68, 63.55%). APACHE II score, need for and the duration of mechanical ventilation, need for inotropic agents, the duration of intensive care unit stay, and the mortality rate were higher in medical patients than in surgical patients.

Conclusions: The mortality rates of the medical patients were high; nevertheless, we believe that surgical patients more benefit from intensive care unit follow-up.

Keywords: Aged; Patient; Intensive Care Unit; Mortality.

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INTRODUCTION

The world population is ageing rapidly, and according the Turkey Statistical Institute data, 0.11% of the total population was aged ≥90 years in 2018 (1). In conjunction with the increase in the number of the elderly population, the number of elderly patients requiring intensive care unit (ICU) admission is on the rise. Elderly patients form an essential part of the patients admitted to ICU (2). These patients need follow-up in ICU due to acute exacerbations of existing chronic diseases or following a surgical procedure. Although nonagenarians, namely individuals aged ≥90 years represent a small subgroup, they are at high risk of death. In the literature, many studies frequently evaluating patients aged 65 years or ≥80 years can be found (3,4). However; only a few studies on elderly patients in ICU have included nonagenarians (5-7). Therefore, this study investigated the epidemiologic characteristics and outcomes of elderly patients aged ≥90 years who were admitted to ICU.

MATERIALS AND METHODS

This study was approved by the Ethics and Research Committee of Karabuk University (No:77192459-050.99-E.1826). From 1 January, 2015 to 1 January, 2018, the medical records of patients aged ≥90 years admitted to the ICU of Karabuk University Hospital, Turkey, for ≥24 h were reviewed in this retrospective observational study. For patients with multiple ICU admissions, only the first admission was considered. All patients aged < 90 years, as well as those admitted to the cardiac ICU were excluded. The ICUs of Karabuk University Training and Research Hospital are closed ICUs where patients are treated by full-time critical care physicians.

The following parameters were recorded; age, sex, comorbidities, hospital stay prior to the ICU admission, the main reason for the ICU admission (medical; respiratory, gastrointestinal, neurological, renal diseases, cardiopulmonary resuscitation, sepsis, or surgical; unscheduled or scheduled surgery), Acute Physical and Chronic Health Evaluation II (APACHE II) score on ICU admission, need for and duration of mechanical ventilation (MV), need for inotropic agents, duration of ICU stay and mortality rate.

Statistical analysis: Statistical analyses were performed using SPSS 14.0. Quantitative variables were reported as mean standard deviation (SD). Nominal variables were expressed as number and percentages. The mean data were compared using the Student's t test. Categorical data were compared using the chi-square test or Fisher's exact test upon compatibility. $P<0.05$ was considered statistically significant.

RESULTS

During the three years, 3257 patients were admitted to the ICU. A total of 124 patients were aged ≥90 years. Of these patients, 10 who were discharged before 24 h of ICU admission, and 7 with missing data were excluded. Thus, 107 (3.29%) patients participated in the study.

The mean age of the patients was 92.65 ± 2.36 years. Women comprised most of the patients (n=72, 67.29%). The mean APACHE II scores on ICU admission were 23.6 ± 7.2. A total of 96 (89.72%) patients had at least one comorbid disease. The main comorbidities were systemic arterial hypertension, heart disease, diabetes mellitus, respiratory diseases, neurodegenerative disease, and chronic renal failure.

Most patients were admitted to the ICU for medical reasons (n=82, 76.64%). Respiratory diseases (56.10%), neurological diseases (14.63%), and cardiopulmonary resuscitation (12.19%) were the most frequent medical causes. 25 patients (23.36%) were accepted for surgical reasons, of which 24% underwent unscheduled surgery.

A total of 82 patients (76.64%) were mechanically ventilated, and the mean MV duration was

9.23 ± 2.8 days. Moreover, 73 patients (68.22%) patients required inotropic treatment and 8 patients (7.47%) underwent RRT. The mean duration of ICU stay was 11.82 ± 3.9 days (Table 1). Sixty-four of the medical patients, and four of the surgical patients had died in the intensive care unit (n = 68, 63.55%).

When we grouped the patients as medical and surgical, we found that the APACHE II score, need for MV, MV duration, need for inotropic agents, duration of ICU stays, and mortality rate were higher in medical patients than in surgical patients (Table 2).

DISCUSSION

In the study, nonagenarians represented approximately 3.29% of ICU admissions, and the ICU mortality rate was 63.55%. Few studies have analyzed the outcome of the nonagenarians. Sim et al. examined 155 patients aged ≥90 years, and reported ICU admission rates and ICU mortality rates were 0.92% and 32.3%, respectively (7). Rellos et al. found that the proportion of nonagenarians in ICU was 1.1%, with an ICU mortality of 20 % (8). Becker et al. reported these rates as 1.1% and 18.3%, respectively (6).

Table 1. Patients' general characteristics and clinical data.

Variables		
Age (years), mean±SD		92.65 ± 2.36
Sex (female/male), n (%)		72/35 (67.29/32.71)
Comorbidities, n(%)	**Systemic arterial hypertension**	66 (61.68)
	Diabetes mellitus	42 (39.25)
	Heart disease	52 (48.59)
	Respiratory diseases	36 (33.64)
	Neurodegenerative disease	32 (29.90)
	Chronic renal failure	12 (11.21)
	Others	22 (20.56)
Admission category n(%)	**Medical**	82 (76.64)
	Surgical	25 (23.36)
APACHE II score, mean ± SD		23.6 ± 7.2
Need for MV, n(%)		82 (76.64)
Duration of MV (days), mean±SD		9.23 ± 2.8
Need for inotropes, n(%)		73 (68.22)
Need for RRT, n(%)		8 (7.47)
Duration of ICU stay(days), mean±SD		11.82 ± 3.9
Mortality, n(%)		68 (63.55)

Data are stated as mean ± standard deviation (mean ± SD) or patient number and percentage (n, %). APACHE II: Acute Physical and Chronic Health Evaluation, MV: Mechanical ventilation, RRT: Renal replacement therapy, ICU: Intensive care unit.

Table 2. Comparison of demographic and clinical data of the medical and surgical patients.

	Medical (n=82)	Surgical (n=25	P value
Age (years), mean ± SD	93.68±2.8	91.54±3.2	0.13
Female sex, n (%)	57 (69.51)	15 (60)	0.87
APACHE II score, mean ± SD	28.48±6.1	19.22±8.5	<0.001*#
Need for MV, n(%)	76 (92.68)	6 (24)	<0.001†#
Duration of MV (days), mean ± SD	11.64±2.8	1.45±1.1	<0.01*#
Need for inotropes, n(%)	68 (82.92)	5 (20)	<0.001†#
Need for RRT, n(%)	6 (7.31)	2 (8)	0.18
Duration of ICU stay(days), mean ± SD	14.46±2.5	3.16±3.1	<0.01*#
Mortality, n(%)	64 (78.04)	4 (16)	<0.001†#

Data are stated as mean±standard deviation (mean ± SD) or patient number and percentage (n, %). APACHE II: Acute Physical and Chronic Health Evaluation, MV: Mechanical ventilation, RRT: Renal replacement therapy, ICU: Intensive care unit. *Student's t test, †Pearson's chi-square test, #Statistically significant difference between groups.

Although chronological age is associated with higher rates of ICU mortality, other studies have found the severity of illness, reason for admission, and comorbidities to be more important risk factors than age itself (9-11).

The outcome of very elderly patients varies depending on the reasons for ICU admission. In previous studies, the mortality rate has been reported to be higher in medical patients than in surgical patients. Bagshaw et al. reported that after scheduled surgery, the ICU and hospital mortality rate were 12 and 25 %, respectively (12). Other studies have found the, rates were 38 and 64 % for medical patients and 45 and 55 % for unscheduled surgery patients (9,13). In the present study, the ICU mortality rate was higher in medical patients (78.04%) than in surgical patients (16%).

Mechanical ventilation and inotropic support have been associated with mortality in patients admitted to ICU (14). In an ongoing Indian study, mechanical ventilation and inotropic support proved to increase mortality in geriatric patients (15).

Sim et al. have found that high Simplified Acute Physiology Scoring II scores, poor nutritional status, high glucose, use of vasopressors, and DNR orders should be considered as significant predictors of mortality in very elderly ICU patients (7). In a study on 104 patients aged >85 years, van den Noortgate et al. found inotropes as an independent risk factor in mortality (16). Orsini et al. found that advanced age, critical illness, cardiopulmonary resuscitation, and needs for mechanical ventilation and/or vasopressor therapy are independent risk factors associated with adverse outcome in elderly patients admitted to ICU (14). Similar to these results, this investigation revealed that medical patients had higher APACHE II score, need for MV, need for inotropes, and mortality rate.

There are noteworthy several limitations to the present study. First, this was a single-centre, non-randomised retrospective study. The long-term outcome of patients could not be assessed

because of the retrospective nature of the study. Last, because ICU management can be different in each hospital, we cannot generalise our findings.

Although patients aged ≥90 years are a small subgroup of the elderly population, their numbers are increasing. Elderly patients have high ICU mortality, but studies have shown that only age does not affect mortality. In our study, we found that the mortality rates of medical patients were high. Nevertheless, we believe that surgical patients benefit more from ICU follow-up.

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