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Emergency department admission and outcomes in geriatric patients: a single-center prospective cohort study

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ABSTRACT

Geriatric patients often present with nonspecific complaints. In other words, a lack of a specific complaint in patients presenting with decreased level of consciousness, weakness, and an acute serious condition is present in 51-59% of such patients. The list of differential diagnoses is extensive, making epidemiologic studies that address this population of paramount importance. This study aims to identify diagnoses and analyze outcomes in a geriatric population in a Brazilian ED. This is a single-center, prospective cohort study from March to December 2019. This study examined the demographics, care and outcomes for all older people (> 65 years) who were sufficiently medically ill to require hospital admission after their index ED presentation. We enrolled 237 patients during the study period. The mean age was 74.9 with a standard deviation of 7.7. The majority (58.3%) was male. Their main comorbidities were stroke – 15.2%, previous myocardial infarction – 14.8% and cancer – 5.9%. The cohort has a mean score of 2.5 on the activities of daily living (ADL) scale and 45% are classified as fragile, 44% as pre-fragile and only the remaining 11% are not fragile. Patients went on to surgery in 22.3% of cases, were admitted to the ICU in 28.1%, were intubated in 22.2% and died in 14.1% of the cases. Frail patients and those with impairment of activities of daily living had higher mortality rates.

Keywords: Emergency Medical Services; Aged; Mortality.

Introduction

Every day, the Emergency department (ED) provides care for patients of all ages[1]. Geriatric patients often present with nonspecific complaints[2]. This concept has been defined as “rapid decline of a conscious patient’s own experience in mental and/or physical condition without signs or symptoms from a specific organ and without ongoing fever”[3].In other words, it is a lack of a specific complaint in a patient presenting with weakness. An acute serious condition is present in 51-59% of such patients and the list of differential diagnoses is extensive, making epidemiologic studies that address this population of paramount importance[4, 5].

Furthermore, geriatric patients who come to the ED have higher rates of admission, longer lengths of hospital stay, unplanned hospital readmissions, functional dependency, and higher mortality when compared to younger patients[6, 7, 8,9,10].

Professional and academic communities have been warning of the impact of global aging and longevity, as well as the need to address the changing needs of the population[11]. However, the knowledge related to this subject, particularly at a national level, is incipient. Therefore, it becomes important to analyze aspects that must be addressed to provide better care for the elderly population in the Brazilian

reality. This study aims to identify diagnoses and analyze outcomes in a geriatric population in a Brazilian ED.

Methods

Study Design and Settings

We undertook a single-center, prospective cohort study from March to December 2019. The *Hospital das Clínicas da Universidade de São Paulo* is one of the largest hospitals in Latin America. The ED has greater than 45,000 attendances a year, including that by approximately 7,000 older people.

The study protocol was approved by the Research Ethics Committee of the *Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo* (protocol number CAAE 77169716.2.0000.0068) with written informed consent documented in the patient's charts. Patient anonymity was preserved. The study was registered in the Brazilian registry of clinical trials under the registration RBR-233bct.

Selection of Participants

This study examined demographics, care and outcomes for older patients (> 65 years) who were sufficiently medically ill to require hospital admission after their index ED presentation during the study period (March 1, 2019 to December 31, 2019). We excluded patients who had been admitted longer than 24 hours before the study interview. Given the exploratory nature of this study, no prior sample size calculation was undertaken. On the one hand, we believed there would be tens of thousands of eligible patients coming to our service each year each year, with high readmission and mortality rates expected in this older population, ensuring that a sufficient number of events would be observed during the study follow-up. On the other hand, we knew that we would exclude many patients from the sample, because most of the patients admitted to our ED are transferred from other and had been hospitalized for more than 24 hours.

Data

The baseline and outcome data related only to the index ED presentation (the individual's first emergency presentation during the study period). Baseline data included age, sex, Clinical Frailty Scale score, and the Charlson Comorbidity Index, and diagnosis. Outcomes were limited to length of stay, ICU admission and in-hospital mortality. All participants were followed up until the study ended.

Statistical analysis

Descriptive statistics were calculated for all study variables. Data was expressed as absolute frequencies and percentages for categorical variables. For normally and non-normally distributed continuous variables, data was expressed as means and standard deviations and as medians with interquartile ranges, respectively. All statistical tests were two-sided, and p-values < 0.05 were considered statistically significant. We used Student's t-test for parametric variables and the Kruskal-Wallis' test for non-parametric variables. Study data was collected and managed using REDCap electronic data capture tools hosted at this institution. Statistical analyses were performed using StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP and using R version 4.0.3 (2020-10-10), packages miselect and mice.

Results

We enrolled 237 patients during the study period. The mean age was 74.9 with a standard deviation of 7.7. The majority (58.3%) was male. These patients were mostly married (46.5%) or widowed (31.0%). Their main comorbidities included stroke – 15.2%, previous myocardial infarction – 14.8% and cancer – 5.9%. There were 2.1% of patients with dementia. The cohort had a mean score of 2.5 on the activities of daily living (ADL) scale and 45% are classified as fragile, 44% as pre-fragile and only the remaining 11% are not fragile (Table 1). Patients were submitted to surgery in 22.3% of cases, admitted to the ICU in 28.1%, intubated in 22.2% and died in 14.1% of the cases (Table 2).

We examined the characteristics of the patients who died compared to those who were discharged alive (Table 1). Patients who died were older than patients who were discharged alive (77.9 vs. 74.5, p=0.0157) and had significantly higher ADL scores (p=0.0425). Patients with ADL scores below 6 had a mortality rate of 12% while those with higher scores had two times the mortality rate (24%). Patients who died were more often classified as fragile: 62.5% vs 41.3%, p=0.0281. In fact, fragile patients had double the mortality rates of non-fragile patients (20.8% vs 10.1%). Frailty and ADL scores are correlated (p=0.012).

Surgical patients had a similar mortality rate to non-surgical patients. Patients who were intubated (61% vs 23%) or those were admitted to the ICU (55% vs 18%) had higher mortality rates.

Table 1. Baseline characteristics of elderly patients in the emergency department.

Demographic information	***Total***	***Discharged alive***	***Death***
Total No.	237*	201	33
Age, mean, y	74.9 (7.7)	74.5 (7.5)	77.9 (9.16)
Sex			
Female	95 (41.7)	75 (40.1%)	15 (46.9%)
Male	133 (58.3)	112 (59.9%)	17 (53.1%)
School years, median (IQR), y	4 (2 – 8)	5.5 (2 – 8)	5.2 (3 – 8)
Civil status			
Single	21 (9.2%)	18 (9.7%)	2 (6.3%)
Married	105 (46.4%)	90 (48.7%)	13 (40.6%)
Widowed	70 (30.9%)	52 (28.1%)	13 (40.6%)
Separated	30 (13.2%)	25 (13.5%)	4 (12.5%)
Comorbidities			
Cancer	14 (5.9%)	11 (5.6%)	2 (3.0%)
Cardiovascular disease			
Hypertension	166 (70.0%)	136 (69.7%)	23 (69.7%)
Coronary artery disease	15 (6.3%)	13 (6.7%)	2 (6.1%)
Congestive heart failure	23 (9.7%)	19 (9.7%)	4 (12.1%)
Chronic respiratory disease			
Asthma	4 (1.7%)	4 (2.1%)	0
Chronic obstructive pulmonary disease	10 (4.2%)	8 (4.1%)	2 (6.1%)
Kidney disease			
Chronic	25 (10.5%)	21 (10.8%)	4 (12.1%)
Liver disease			
Cirrhosis	12 (5.0%)	8 (4.1%)	3 (9.1%)
Metabolic disease			
Obesity (IMC > 30)	3 (1.3%)	3 (1.5%)	0
Diabetes	81 (34.2%)	68 (34.9%)	12 (36.4%)
Neurologic disease			
Stroke	36 (15.1%)	31 (15.9%)	1 (3.0%)
Dementia	5 (2.1%)	5 (2.6%)	0
ADL scale	2.5 (0 – 6)	2 (0 – 5)	3 (0.5 – 10)
Osteomuscular			
Osteoarthritis	22 (9.2%)	21 (10.8%)	1 (3.0%)
Osteoporosis	18 (7.5%)	18 (9.2%)	0
No comorbidity	1 (0.4%)	1 (0.5%)	0
Non frail	24 (11%)	23 (13%)	1 (3%)
Pre-frail	96 (44%)	84 (46%)	11 (34%)
Frail	97 (45%)	76 (42%)	20 (63%)
Polypharmacy	92 (41%)	79 (42%)	12 (39%)
Surgery	52 (22%)	45 (22%)	8 (24%)

ADL: activities of daily life scale.

Table 2. Outcomes of elderly patients in the ED.

Outcome	**Total**	**Discharged alive**	**Death**
Intubation	52 (22%)	34 (17%)	18 (55%)
ICU Admission	66 (28%)	46 (23%)	20 (61%)
Death	33 (14%)	–	–

Discussion

Older people take longer time to triage and diagnose[12,13], and consume more exams and resources in general[14]. Furthermore, diagnostic accuracy is lower and there are frequent missed diagnoses[15, 16], making studies that analyze this population, their unique characteristics and prognostic factors of paramount importance. In this cohort we focused on fragility and activities of daily living. These factors had an important impact on the mortality rate. Frail patients and those patients whose activities of daily living were compromised had double the mortality rate in our emergency department of non-frail and more independent patients. This suggests that patients should be evaluated for frailty and dependency and raises the hypothesis that these patients should be under increased scrutiny during their ED stay. Frailty and higher ADL scores are correlated[17]. Frailty has previously been associated with increased risk of hospital admission, mortality but not increased risk of 30-day emergency department revisit[18]. While frailty and higher ADL scores are certainly markers of more compromised patients, these patients could present with more unspecific signs and symptoms and could have more difficulty in expressing their symptoms. They could be at increased risk for aspiration pneumonia or other infections, for example. Measures directed at these hypotheses, such as, elevation of the head of the bead, considering not providing peptic ulcer disease

prophylaxis and oral hygiene provided to these patients at most risk could impact their mortality.

Limitations

This was a convenience sample and may not fully represent the basal characteristics of patients who come in off hours.

Conclusion

All elderly patients who present to the emergency department have comorbidities and most are frail or pre-frail. Frail patients and those with impairment of activities of daily living have higher mortality rates.

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