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BRIEF ORIGINAL

Mortality hospital of nonagenarian patients in Internal Medicine☆

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KEYWORDS
Nonagenarians;
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Abstract
Objectives: To describe the predictors of hospital mortality in nonagenarian patients.
Patients and method: We retrospectively studied 421 patients aged 90 years or older hospitalised in a department of internal medicine. Using logistic regression, we analyzed the association between demographic, clinical and functional parameters and hospital mortality.
Results: The mean age was 92.5 years (SD ± 2.5), and 265 (62.9%) of the patients were women. The main diagnoses were infectious diseases (257 patients, 61%) and heart failure (183, 43.5%), and the mean stay was 11.9 days (SD ± 8.6). During the hospitalization, 96 patients died (22.8%). The predictors of mortality were age ($p = .002$), functional state ($p = .006$), comorbidity ($p = .018$) and diagnoses of pneumonia ($p = .001$), sepsis ($p = .012$) and respiratory failure ($p < .001$).
Conclusion: The hospital mortality of nonagenarian patients treated in internal medicine exceeds 20% and is associated with pneumonia, comorbidity burden and functional impairment.
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PALABRAS CLAVE
Nonagenarios;
Hospitalización;
Medicina Interna;
Mortalidad

Mortalidad hospitalaria de pacientes nonagenarios en Medicina Interna

Resumen
Objetivos: Describir los factores predictivos de mortalidad hospitalaria en pacientes nonagenarios.
Pacientes y método: Se estudió retrospectivamente a 421 pacientes ≥ 90 años ingresados en un servicio de Medicina Interna. Se analizó mediante regresión logística la asociación de parámetros demográficos, clínicos y funcionales con la mortalidad intrahospitalaria.

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Resultados: La edad media (DE) fue de 92,5 años (2,5), con 265 (62,9%) mujeres. Los principales diagnósticos fueron enfermedades infecciosas (257 pacientes, 61%) e insuficiencia cardiaca (183, 43,5%), y la estancia media fue de 11,9 días (8,6). Durante el ingreso fallecieron 96 pacientes (22,8%). Los factores predictivos de mortalidad fueron la edad (p = 0,002), el estado funcional (p = 0,006), la comorbilidad (p = 0,018) y los diagnósticos de neumonía (p = 0,001), sepsis (p = 0,012) e insuficiencia respiratoria (p < 0,001).
Conclusión: La mortalidad hospitalaria de pacientes nonagenarios atendidos en Medicina Interna supera el 20% y se asocia a neumonía, carga de comorbilidad y deterioro funcional.
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Background

The longer life expectancy in western countries has resulted in an increase in the nonagenarian population.[1] In fact, it is predicted that this group will grow proportionally faster than other age groups.[2] There has been a parallel increase in their hospitalization rates, mainly in internal medicine departments,[3] where these patients constitute 6% of hospitalizations.[4] There are limited studies on the predictors of hospital mortality of nonagenarian patients in medical departments,[4–6] although there is information on mortality in surgery departments.[7,8] The aim of this study was to analyze the factors related to the hospital mortality of nonagenarian patients hospitalized in internal medicine departments.

Patients and methods

We retrospectively studied all patients older than 90 years who were consecutively hospitalized over a period of 4 years in the department of internal medicine of a tertiary hospital, whose assigned population is approximately 350,000 inhabitants. The hospital lacks a department of geriatric medicine, and therefore most nonagenarian patients with medical problems are admitted to the department of internal medicine. We excluded the patients who died in the emergency department and 2 patients whose medical history was incomplete. The study was approved by our hospital's clinical research ethics committee (code: CONH90-2011-01).

We collected sociodemographic data, including age, sex, cohabitation and type of residence prior to admission (living alone, with relatives or in a nursing home). The patients' functional state was assessed prior to admission using the Red Cross disability scale, which varies between 0 (independent for daily life activities) and 5 points (maximum dependence).[9] We calculated the Charlson comorbidity index,[10] which categorized the patients, according to the original classification, into 4 groups: 0, 1–2, 3–4 and $\geq$5 points.[10] Information was also obtained on other personal antecedents (arterial hypertension, atrial fibrillation, dyslipidemia, anemia and pressure ulcers), prior hospitalizations for medical reasons and various laboratory parameters obtained in the first 48 h of the hospitalization (hemoglobin, creatinine and albumin levels). The glomerular filtration rate was estimated using the Modification of Diet in Renal Disease-4 formula. We also included the main diagnoses, length of stay and hospital mortality.

Statistical analysis

The statistical analysis was performed using the statistical program SPSS, version 17.0 for Windows (Chicago, IL, USA). To assess the relationship between hospital mortality and the qualitative variables, we employed the chi-squared test and Fisher's exact test. For the quantitative variables, we employed Student's *t*-test and the Mann–Whitney *U* test, depending on whether the variables followed a normal distribution. We then performed a multivariate analysis using a logistic regression test, using the forward stepwise method to assess the factors independently associated with hospital mortality. We considered mortality as the dependent variable. The independent variables, in addition to age and sex, were considered those that showed a significant association in the univariate analysis. Results with *p* values <.05 were considered statistically significant.

Results

The study sample included 421 patients, with a median age of 92 years (range 90–104, interquartile range 91–94), 265 (62.9%) of whom were women.

Most of the patients (351, 84.8%) lived at home with a companion or in the home of a family member, 32 (7.6%) lived in a nursing home, and 32 (7.6%) lived alone. A third of the patients (145, 34.4%) had been previously hospitalized for medical diseases.

The main diagnoses at admission were acute infections (257 patients, 61%), heart failure (183, 43.5%), respiratory failure (49, 11.6%) and gastrointestinal hemorrhage (31, 7.5%). The most prevalent infections were urinary tract infections (103 patients, 24.5%), pneumonia (93, 22.1%) and sepsis (20, 4.8%).

The most common comorbidities were arterial hypertension (241, 57.2%), diabetes mellitus (108, 25.7%), atrial fibrillation (150, 35.6%), dementia (98, 23.3%), chronic renal

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