



Original Article

Geriatric Assessment and Prognostic Factors of Mortality in Very Elderly Patients With Community-Acquired Pneumonia[☆]



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ABSTRACT

Introduction: To assess the relationship between the parameters obtained in the geriatric assessment and mortality in elderly people with community-acquired pneumonia in an acute care geriatric unit.

Methods: Four hundred fifty-six patients (≥ 75 years). Variables: age, sex, referral source, background, consciousness level, heart rate, breathing rate, blood pressure, laboratory data, pleural effusion, multilobar infiltrates, functional status (activities of daily living) prior to admission [Lawton index (LI), Barthel index (Blp)] prior to and at admission (Bla), cognitive status [Pfeiffer test (PT)], comorbidity [Charlson index (ChI)] and nutrition (total protein, albumin).

Results: A hundred ten patients died (24.2%) during hospitalization. These patients were older (86.6 ± 6.4 vs 85.1 ± 6.4 , $P < .04$), had more comorbidity (ChI 2.35 ± 1.61 vs 2.08 ± 1.38 ; $P < .083$), worse functional impairment [(LI: 0.49 ± 1.15 vs 1.45 ± 2.32 , $P < .001$) (Blp: 34.6 ± 32.9 vs 54.0 ± 34.1 , $P < .001$) (Bla: 5.79 ± 12.5 vs 20.5 ± 22.9 , $P < .001$)], a higher percentage of functional loss at admission (85.9 ± 23.2 vs 66.4 ± 28.6 ; $P < .0001$), worse cognitive impairment (PT: 7.20 ± 3.73 vs 5.10 ± 3.69 , $P < .001$) and malnutrition (albumin 2.67 ± 0.54 vs 2.99 ± 0.49 , $P < .001$). Mortality was higher with impaired consciousness [49.2% ($P < .01$)], tachypnea [33.3% ($P < .01$)], tachycardia [44.4% ($P < .002$)], high urea levels [31.8 ($P < .001$)], anemia [44.7% ($P < .02$)], pleural effusion [42.9% ($P < .002$)], and multilobar infiltrates [43.2% ($P < .001$)]. In the multivariate analysis, variables associated with mortality were: age ≥ 90 years [OR: 3.11 (95% CI: 1.31–7.36)], impaired consciousness [3.19 (1.66–6.15)], hematocrit $< 30\%$ [2.87 (1.19–6.94)], pleural effusion [3.77 (1.69–8.39)] and multilobar infiltrates [2.76 (1.48–5.16)]. Female sex and a preserved functional status prior (LI ≥ 5) and during admission (Bla ≥ 40) were protective of mortality [0.40 (0.22–0.70), 0.09 (0.01–0.81) and 0.11 (0.02–0.51)].

Conclusions: Geriatric assessment parameters and routine clinical variables were associated with mortality.

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Valoración geriátrica y factores pronósticos de mortalidad en pacientes muy ancianos con neumonía extrahospitalaria

RESUMEN

Introducción: Analizar la relación de parámetros obtenidos en la valoración geriátrica con la mortalidad en ancianos con neumonía extrahospitalaria (NEH) en una unidad de geriatría de agudos (UGA).

Método: Un total de 456 pacientes (≥ 75 años). Variables: edad, sexo, procedencia, antecedentes, nivel de conciencia, frecuencia cardíaca y respiratoria, presión arterial, datos de laboratorio, derrame pleural, afectación multilobar, capacidad funcional (independencia para actividades de la vida diaria) previa

Palabras clave:

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al ingreso (índice de Lawton [IL], índice de Barthel previo [IBp]) y en el momento del ingreso (IBi), función cognitiva (test de Pfeiffer [TP]), comorbilidad (índice de Charlson [Ch]) y nutrición (proteínas totales, albúmina).

Resultados: Los 110 pacientes que fallecieron durante el ingreso (24,2%) tuvieron mayor edad ($86,6 \pm 6,4$ vs $85,1 \pm 6,4$; $p < 0,04$), mayor comorbilidad (ICH $2,35 \pm 1,61$ vs $2,08 \pm 1,38$; $p < 0,083$), menor capacidad funcional (IL: $0,49 \pm 1,15$ vs $1,45 \pm 2,32$; $p < 0,001$; IBp: $34,6 \pm 32,9$ vs $54,0 \pm 34,1$; $p < 0,001$; IBi: $5,79 \pm 12,5$ vs $20,5 \pm 22,9$; $p < 0,001$), mayor porcentaje de pérdida funcional al ingreso ($85,9 \pm 23,2$ vs $66,4 \pm 28,6$; $p < 0,0001$), mayor deterioro cognitivo (TP: $7,20 \pm 3,73$ vs $5,10 \pm 3,69$; $p < 0,001$) y mayor desnutrición (albúmina $2,67 \pm 0,54$ vs $2,99 \pm 0,49$; $p < 0,001$). Hubo también mayor mortalidad con alteración de conciencia (49,2%; $p < 0,01$), taquipnea (33,3%; $p < 0,01$), taquicardia (44,4%; $p < 0,002$), urea elevada (31,8%; $p < 0,001$), anemia (44,7%; $p < 0,02$), derrame pleural (42,9%; $p < 0,002$) y afectación multilobar (43,2%; $p < 0,001$). En el análisis multivariado resultaron significativos: edad ≥ 90 años (OR: 3,11 [IC 95%: 1,31–7,36]), alteración de conciencia (3,19 [1,66–6,15]), hematocrito $< 30\%$ (2,87 [1,19–6,94]), derrame pleural (3,77 [1,69–8,39]) y afectación multilobar (2,76 [1,48–5,16]). El sexo femenino y la capacidad funcional más conservada previa (IL ≥ 5) y en el momento del ingreso (IBi ≥ 40) fueron protectores de mortalidad (0,40 [0,22–0,70]; 0,09 [0,01–0,81] y 0,11 [0,02–0,51]).

Conclusiones: Los parámetros de valoración geriátrica y las variables clínicas habituales estuvieron relacionados con la mortalidad.

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Introduction

The annual incidence of pneumonia in adults in population studies ranges from 5% to 11%. In Spain, the incidence is around 1.6–1.8 episodes/1000 inhabitants/year, predominantly in winter and in elderly men. The number of hospital admissions due to pneumonia increases with age (1.29/1000 in patients aged 18–39 years, compared to 13.21/1000 in patients over the age of 55). Mortality can range from 1% to 5% in outpatients and from 5.7% to 14% in hospitalized patients. This increases when mid to long-term mortality is evaluated, and figures of up to 8% at 90 days, 21% at 1-year and 36% at 5 years have been reported.^{1–3}

Factors traditionally associated with greater mortality in community-acquired pneumonia (CAP) are: underlying disease; mental deterioration; respiratory failure; multilobar involvement on X-ray; advanced age.⁴ Pneumonia severity can be evaluated using a number of instruments and indexes. Of particular value are the Fine or Pneumonia Severity Index (PSI) and the Confusion, Urea, Respiratory rate, Blood pressure, age ≥ 65 (CURB 65).^{5,6} Both indexes use clinical variables obtained from patient histories, physical examination and laboratory data, and have proved useful in identifying patients with disease severity requiring hospitalization. Although these indexes were not specifically designed for the geriatric population, they are valuable for predicting a prolonged hospital stay and mortality in elderly patients.⁷

Disease prognosis in the elderly is often influenced by the patient's underlying state of health, defined by nutritional status, mental status and functional capacity (level of independence for activities of daily living). Deterioration in these areas has been identified as a possible independent factor for mortality in elderly CAP patients.^{3,7–11}

Few prognostic indexes currently used in clinical practice include these underlying health status variables. Comprehensive geriatric assessment is a working system that consists of a systematic evaluation using instruments and scales to determine the different health areas affecting the elderly patient: most importantly, functional capacity (level of independence for activities of daily living), cognitive function, nutritional status, and social and family environment.¹² This systematic assessment is routinely undertaken in geriatric units.^{12,13} The aim of this study was to analyze the possible relationship between the parameters obtained from the geriatric assessment and in-hospital mortality in a group of very elderly CAP patients.

Method

Participants

Prospective study including all patients aged 75 years or older consecutively hospitalized with a diagnosis of CAP in an acute care geriatric unit (AGU) over a period of 5 years.

CAP diagnosis was based on clinical criteria (cough, secretion mobilization, expectoration, dyspnea and/or chest pain) and radiological confirmation (recently developed pulmonary infiltration on chest X-ray). All patients were admitted via the emergency room.

Variables

The following variables were recorded on admission: age, sex, place of residence before admission, disease history, level of consciousness, heart and breathing rate, blood pressure, laboratory parameters (urea, sodium, blood glucose, hemoglobin and arterial pH), oxygen saturation, pleural effusion, multilobar involvement on chest X-ray. Many of these variables are included in the prognostic indexes most commonly used in clinical practice (PSI, CURB). All patients underwent comprehensive geriatric assessment including variables related to his/her prior status and variables collected at the time of admission. Functional status before admission was evaluated by determining the level of independence for instrumental activities of daily living with the Lawton index (LI) and for basic activities using the Barthel index (Blp).^{14,15} The data for these scales were collected from the patient and/or family members. The patient's pre-admission status regarding immobility syndrome, pressure ulcers (PU) and/or cognitive deterioration was recorded.

Functional capacity at the time of admission was also evaluated using the Barthel index (Bla) and the percentage of functional loss due to the acute episode was calculated using the formula $[(Blp - Bla) / Blp \times 100]$. Cognitive function was evaluated using the Pfeiffer test (PT),¹⁶ comorbidity [Charlson index (ChI)],¹⁷ immobility syndrome, PU, delirium and nutritional status (total proteins and serum albumin) were also recorded on admission.

Statistical Analysis

Statistical analyses were performed using SPSS 18.0 software (IBM Corporation). Qualitative variables were compared using the Chi-squared test or Fisher's exact test, as appropriate. Student's *t*-test was used for associations between qualitative variables and quantitative variables. Statistical significance was set at $P < .05$.

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