ARCHIVOS DE BRONCONEUMOLOGIA

Original Article

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

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ARTICLE INFO

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

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 ($\geq$ 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

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 [ICh]) y nutrición (proteínas totales, albúmina).

Resultados: Los 110 pacientes que fallecieron durante el ingreso (24,2%) tuvieron mayor edad (86,6 ± 6,4 vs 85,1 ± 6,4; p < 0,04), mayor comorbilidad (ICh 2,35 ± 1,61 vs 2,08 ± 1,38; p < 0,083), menor capacidad funcional (IL: 0,49 ± 1,15 vs 1,45 ± 2,32; p < 0,001; IBp: 34,6 ± 32,9 vs 54,0 ± 34,1; p < 0,001; IBi: 5,79 ± 12,5 vs 20,5 ± 22,9; p < 0,001), mayor porcentaje de pérdida funcional al ingreso (85,9 ± 23,2 vs 66,4 ± 28,6; p < 0,0001), mayor deterioro cognitivo (TP: 7,20 ± 3,73 vs 5,10 ± 3,69; p < 0,001) y mayor desnutrición (albúmina 2,67 ± 0,54 vs 2,99 ± 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.

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 (BIp).[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 (BIa) and the percentage of functional loss due to the acute episode was calculated using the formula [(BIp−BIa)/BIp×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.

Table 1

Characteristics of the Overall Patient Sample: Sociodemographic Data and Parameters Obtained From the Geriatric Assessment (n=456).

Variables	
Age in years, mean±SD	85.4±6.4
Sex, n (%)	
Men	218 (47.8)
Women	238 (52.2)
Residence before admission, n (%)	
Home	302 (66.2)
Care home or healthcare institution	154 (33.8)
Mean stay, days, mean±SD	11.2±7.1
In-hospital mortality, n (%)	110 (24.2)
Comorbidity: Charlson index, mean±SD	2.15±1.44[a]
Functional capacity before admission, mean±SD	
Lawton index	1.24±2.15[b]
Barthel index	49.7±34.8[c]
Functional and cognitive capacity at time of admission, mean±SD	
Barthel index	17.1±21.9[c]
Percentage loss of functional capacity	71±28.7[d]
Cognitive function; Pfeiffer test	5.4±3.7[e]
Nutritional status, mean±SD	
Total proteins (g/dl)	6.06±0.77[f]
Albumin (g/dl)	2.94±0.51[g]
Geriatric syndromes before admission, n (%)	
Immobility	124 (27.1)
Pressure ulcer	31 (6.8)
Cognitive deterioration	226 (49.5)
Geriatric syndromes occurring during admission, n (%)	
Immobility	54 (13.7)[h]
Pressure ulcer	17 (4.3)[h]
Delirium	114 (25.2)[i]

[a] 0: no comorbidity; 1: low comorbidity; ≥2: high comorbidity.

[b] Range 0–8 points (0=maximum dependence and 8=maximum independence in instrumental activities of daily living).

[c] Range 0–100 points (0=maximum dependence and 100=maximum independence in basic activities of daily living).

[d] 0% indicates no functional loss and 100% indicates complete loss of all functional capacity.

[e] Number of errors (0–2 errors: normal; 3–7 errors: mild-moderate cognitive deterioration; 8–10 errors: severe cognitive deterioration).

[f] Normal values: 6–8 g/dl.

[g] Normal values: 3.5–5.5 g/dl.

[h] Data from 395 patients.

[i] Data from 453 patients.

Table 2

Clinical and Laboratory Variables in Overall Patient Sample (n=456).

Variables	n (%)
Clinical history	
Malignant disease	60 (13.2)
Liver disease	19 (4.2)
Congestive heart failure	37 (8.1)
Cerebrovascular disease	94 (20.6)
Kidney disease	40 (8.8)
Altered level of consciousness	61 (13.5)
Tachypnea (respiratory rate>30 rpm)[a]	84 (38)
Hypotension (systolic BP<90 mmHg)[b]	28 (7.3)
Tachycardia (HR>125 bpm)[c]	45 (11.4)
Arterial pH<7.35[d]	40 (11.9)
Urea>65 mg/dl[d]	211 (46.5)
Hyponatremia (<130 mEq/l)	23 (5.1)
Hyperglycemia (>250 mg/dl)	48 (10.6)
Anemia (hematocrit<30%)	38 (8.4)
Oxygen saturation<90%[e]	92 (38.8)
Pleural effusion	49 (10.7)
Multilobar involvement on chest X-ray[e]	81 (17.8)

[a] Data from 221 patients.

[b] Data from 384 patients.

[c] Data from 396 patients.

[d] Data from 335 patients.

[e] Data from 237 patients.

Table 3

Quantitative Variables From the Geriatric Evaluation and Mortality During Admission (n=456) (Mean±DE).

Variables	Deaths (n=110)	Survivors (n=346)	P
Age (years)	86.6 ± 6.4	85.1 ± 6.4	.036
Comorbidity: Charlson index	2.35 ± 1.61	2.08 ± 1.38[a]	.083
Prior functional capacity			
Lawton index	0.49 ± 1.15	1.45 ± 2.32[b]	.0001
Barthel index	34.6 ± 32.9	54 ± 34.1[c]	<.0001
Functional and cognitive capacity on admission			
Barthel index	5.79 ± 12.5	20.5 ± 22.9[c]	<.0001
Functional loss on admission (%)	85.9 ± 23.2	66.4 ± 28.6[d]	<.0001
Cognitive function: Pfeiffer test	7.20 ± 3.73	5.10 ± 3.69[e]	<.0001
Nutritional status on admission			
Total proteins (g/dl)	5.71 ± 0.70	6.14 ± 0.76[f]	<.0001
Albumin (g/dl)	2.67 ± 0.54	2.99 ± 0.49[g]	<.0001

[a] 0: no comorbidity; 1: low comorbidity; ≥2: high comorbidity.

[b] Range 0–8 points (0=maximum dependence and 8=maximum independence in instrumental activities of daily living).

[c] Range 0–100 points (0=maximum dependence and 100=maximum independence in basic activities of daily living).

[d] 0% indicates no functional loss and 100% indicates complete loss of all functional capacity.

[e] Number of errors (0–2 errors: normal; 3–7 errors: mild-moderate cognitive deterioration; 8–10 errors: severe cognitive deterioration).

[f] Normal values: 6–8 g/dl.

[g] Normal values: 3.5–5.5 g/dl.

Finally, variables that showed significant association with greater mortality on the bivariate analysis were subsequently included in a binary logistic regression multivariate model.

Results

The characteristics of the 456 patients included in the study are shown in Table 1. The sample comprises very elderly patients with a high mean age, many of whom were already dependent before admission for activities of daily living, as can be seen from the low mean LI and BIp scores. The patients were also very dependent at the time of admission with a mean BIa score of 17.1 (range 0–100). Moreover, mean cognitive function scores and nutritional parameters, such as albumin, were altered, and immobility syndrome and cognitive deterioration before admission were common. All these characteristics confirm that the sample consisted of a group of elderly patients in a compromised state of health.

The clinical variables and laboratory data are given in Table 2, showing high rates of cerebrovascular disease, tachypnea, raised urea and low oxygen saturation. These same variables are considered in the Fine PSI index as indicative of poor prognosis and associated with greater mortality.[5]

It can be seen from Table 3 that patients who died during admission had a higher comorbidity burden and were older. This table also shows that all parameters recorded in the geriatric assessment were significantly related with death during admission. Patients who died, therefore, had significantly lower mean LI, BIp, BIa and PT scores, indicating greater dependence in activities of daily living (both prior to and at admission) and poorer cognitive function. Moreover, the mean percentage loss of functional capacity caused by pneumonia was significantly greater in patients who died (85.9%±23.2% vs 66.4%±28.6%; P<.001). Nutritional

Table 4

Qualitative Variables From the Geriatric Evaluation and Mortality During Admission (n=456).

Variables	Patients	Deaths, n (%)	P
Prior geriatric syndromes			
Immobility	124	39 (31.5)	.025
Pressure ulcer	31	9 (29)	.508
Cognitive deterioration	226	59 (26.1)	.326
Geriatric syndromes occurring during admission			
Immobility	54	25 (46.3)	<.0001
Pressure ulcer	17	9 (52.9)	.005
Delirium	114	36 (31.6)	.020

The percentage of deaths and statistical significance were calculated from the sample available for each variable.

Table 5

Clinical, Analytical and Radiological Variables and Mortality During Admission (n=456).

Variables	Patients	Deaths, n (%)	P
Sex			
Men	218	61 (28.0)	.065
Women	238	49 (20.6)	
Residence before admission			
Home	302	54 (35.1)	.000
Care home/Healthcare institution	154	56 (18.5)	
Malignant disease	60	19 (31.7)	.143
Chronic liver disease	19	6 (31.6)	.438
Congestive heart failure	37	11 (29.7)	.406
Cerebrovascular disease	94	26 (27.7)	.368
Kidney disease	40	13 (32.5)	.195
Altered level of consciousness	61	30 (49.2)	.000
Tachypnea (respiratory rate>30 rpm)	84	28 (33.3)	.007
Hypotension (systolic BP<90 mmHg)	28	9 (32.1)	.113
Tachycardia (HR>125 bpm)	45	20 (44.4)	.001
Arterial pH<7.35	40	13 (32.5)	.102
Urea>65 mg/dl	211	67 (31.8)	.000
Hyponatremia (<130 mEq/dl)	23	7 (30.4)	.476
Hyperglycemia (>250 mg/dl)	48	10 (20.8)	.605
Anemia (hematocrit<30%)	38	15 (44.7)	.018
Oxygen saturation<90%	92	17 (18.5)	.808
Pleural effusion	49	21 (42.9)	.001
Multilobar involvement (chest X-ray)	81	35 (43.2)	.000

The percentage of deaths and statistical significance were calculated from the sample available for each variable.

parameters revealed mean total protein and albumin values below normal limits in all patients. Furthermore, these parameters were even lower, to a significant extent, in the group of patients who died. It can be seen from Table 4 that immobility, PU and delirium during admission were significantly more common in patients who died.

Table 5 shows the relationship between clinical variables and laboratory data and mortality. Male sex, admission from home, tachypnea, tachycardia, raised urea, anemia, pleural effusion and multilobar involvement on chest X-ray were significantly more common in patients who died.

Lastly, Table 6 shows variables significantly related with mortality in the multivariate analysis. Age≥90 years, altered consciousness, anemia, pleural effusion and multilobar involvement present an elevated relative risk of death with OR values higher than 1. Female sex and better functional capacity (BIa≥40; LI≥5) present a relative risk of less than 1, suggesting that these variables may act as protective factors against mortality.

Discussion

Mortality among elderly CAP patients in this study was 24%, higher than that reported by other authors.[2,7,9] This may be due to 3 factors:

Table 6

Variables Related With Mortality During Admission in Elderly Patients With Community-Acquired Pneumonia.

Variables	OR	(95% CI)	P
Age≥90 years	3.118	1.31–7.36	.010
Female sex	0.402	0.22–0.70	.001
Barthel index on admission≥40	0.114	0.02–0.51	.005
Lawton index≥5	0.097	0.01–0.81	.031
Altered level of consciousness	3.197	1.66–6.15	.001
Hematocrit<30	2.878	1.19–6.94	.019
Pleural effusion	3.774	1.69–8.39	.001
Multilobar involvement	2.768	1.48–5.16	.001

1. The study was performed in a specific geriatric care unit that only accepted patients over 75 years of age; our patients, therefore, were of advanced age.
2. The study was performed in a hospitalization unit, so all patients had pneumonia requiring admission and presented more criteria for severity (see Table 2 showing a high rate of factors for hospital admission and poor prognosis).
3. Many of our elderly patients were dependent for activities of daily living before admission, suggesting that their baseline health status was poor.

Age is a strong indicator for mortality in patients with pneumonia, as has been reported by numerous authors.[18–21] In this study, age was also significantly related with greater mortality in both the univariate and multivariate analyses. In the latter, mortality rate was three times higher in patients aged≥90. The interesting point here is that even among a homogeneous sample in which almost all subjects are very elderly (i.e., where it is more difficult to differentiate between individuals purely on the basis of age), extreme ages of 90 or older continue to have predictive value and can differentiate a group with poorer prognosis. With regard to comorbidities, no statistically significant relationship with mortality was found in this study. In contrast, other authors such as Nakagawa et al.[22] report a 30% mortality in patients with ChI>3. These divergent results may be due to the different characteristics of the study populations.

In most studies, a greater prevalence of CAP is reported in men,[1] but in our study, there were slightly more women (Table 1). This is probably due to the greater prevalence of women among geriatric populations. In this study, mortality among women was slightly lower than among men, and in the multivariate analysis, female sex was a protective factor against mortality (Table 6). This finding coincides with other studies in which higher mortality was observed among men.[5,6]

This study was conducted in a group of very elderly patients with a generally very poor health status. Nevertheless, the clinical variables and laboratory data usually used as predictive factors for mortality and are generally included in other prognostic indexes (PSI and CURB) continue to have a significant predictive value, as shown in Table 4. It can be seen here that tachypnea, tachycardia, raised urea, anemia, pleural effusion and multilobar involvement are significantly associated with greater mortality. Temperature could not be analyzed since it was recorded dichotomously, as indicated by the PSI (≤35° or ≥40°). None of our patients met this criterion. Moreover, none of the underlying diseases usually recognized as prognostic factors in other studies were significantly related to greater mortality. This would suggest that in the geriatric population, the severity of the acute process and the underlying health status of the elderly person carry more weight than specific comorbidities. Altered consciousness stands out as a variable that is strongly predictive of mortality in both the univariate and the multivariate analyses. These results underline the importance of mental state as a prognostic indicator in elderly patients with acute disease.[8,18,21,23] The importance of the altered level

of consciousness variable can be explained by the appearance of hypoactive delirium, a common clinical situation in this population that is directly related with in-hospital mortality, irrespective of associated pathology.[24,25] The high prevalence of altered consciousness in our study may be due to the fact that our population was very elderly and presented multiple risk factors for delirium. A significant relationship between delirium and in-hospital mortality in elderly subjects with pneumonia has been described in other studies. This relationship was also identified in our population with the univariate analysis (Table 4), although statistical significance was not reached on the multivariate analysis. This may be due to the under-diagnosis of delirium, this being more difficult to determine than mere altered consciousness.[7,8,26]

Plasma urea is included in the main indexes for predicting mortality in CAP (CURB 65, PSI). It was also identified in our study as a predictive factor in the univariate, but not in the multivariate, analysis. This may be explained by the existence of other, more potent, factors in this elderly population. Ewig et al.[7] suggested that urea may not be a very specific predictor of mortality in the elderly, as this is a disturbance commonly found in this population. In contrast, in our study and in other publications,[6,8,27] anemia and malnutrition, also common in the elderly, were prognostic factors for mortality. Nevertheless, only anemia reached statistical significance in the multivariate analysis, suggesting that it can be regarded as a potent prognostic indicator (Table 6). The predictive value of these variables may be explained by both anemia and malnutrition being indirect indicators of a poorer state of health that may also be related with underlying disease.

A better functional capacity prior to and at admission was a protective factor against in-hospital mortality. Several authors have underlined the importance of functional capacity as a predictor of mortality in various diseases.[3,10,11,28] Marrie and Wu[9] found that functional status is a strong predictor of in-hospital death in patients with CAP. Likewise, Davis et al.[3] reported that prior functional status has a similar or better predictive value for in-hospital mortality than laboratory data. Torres et al.,[10] also using the Barthel index, similarly concluded that a better prior functional status acts as a protective factor against death after an episode of CAP. In contrast with these findings, Ma et al.[2] did not find a significant relationship between functional capacity and mortality; these differences may be due to the use of different scales and the different characteristics of the populations studied.

Geriatric syndromes give an overall view of the clinical and functional status of the patient and are indicators of the morbidity and mortality produced by different diseases.[8,9,28] These syndromes are generally interrelated, and the appearance of one often leads to the appearance of another, so it is sometimes difficult to evaluate each individually. A significant relationship was found in the univariate analysis between geriatric symptoms and mortality, although this was not statistically significant in the multivariate analysis. This may be because all elderly patients included in this study had pneumonia that met admission criteria, indicating severe disease. This could suggest that the severity of the pneumonia might have influenced mortality more than the geriatric syndromes. Even so, immobility appears to one of the most significant of the geriatric syndromes: in their study, Marrie and Wu[9] found that it produces a risk of in-hospital death in CAP of up to 25%, compared to a 4% risk in patients who could walk unaided. Similarly, Riquelme et al.[29] reported a relative risk of mortality of 10.7 in bedridden patients.

As we have seen, the parameters obtained in the geriatric assessment have proven their value in the prognosis of mortality in elderly subjects with CAP, as confirmed in our study (Tables 3 and 4). Although the multivariate analysis suggests that age and clinical and laboratory variables are useful for establishing a short-term prognosis of death in a very elderly population, some variables obtained from the geriatric assessment are also very useful for predicting mortality. Functional capacity (greater level of independence) was identified as a protective factor against death and an indicator of good prognosis in the multivariate analysis (Table 5). Nevertheless, the need for similar studies with larger populations of elderly subjects must be emphasized.

Conflicts of Interest

The authors state that they have no direct or indirect conflicts of interest related to the contents of this manuscript.

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