

Functional Assessment of Elderly Patients Admitted for Heart Failure

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The aim of our study was to evaluate the usefulness of functional assessment in very old patients admitted for heart failure. We assessed 188 patients aged >79 years. Their mean age was 84.6 (3.5) years, and 67% were female. Twenty-five patients (13%) died. Mortality was higher in those with more severe disability, with more comorbid conditions (as determined by the Charlson index), and with a low hematocrit and a high creatinine level. Logistic regression analysis showed that the Barthel index, the Charlson index, and the serum creatinine level were statistically significant factors. Functional assessment may help in the identification of elderly patients at a higher risk of death following hospital admission for heart failure.

Key words: Heart failure. Hospitalization. Elderly.

Valoración funcional en pacientes ancianos ingresados por insuficiencia cardiaca

Evaluamos la utilidad de la valoración funcional de las actividades básicas e instrumentales de la vida diaria en pacientes muy ancianos ingresados por insuficiencia cardiaca (IC). Se incluyó a 188 pacientes > 79 años, un 67% mujeres, con una edad media de 84,6 ± 3,5 años. Durante el ingreso fallecieron 25 (13%) pacientes y hubo una mayor mortalidad en los que previamente eran más dependientes para las actividades básicas e instrumentales, con una mayor comorbilidad (índice de Charlson), así como con cifras más bajas de hematocrito y más altas de creatinina. En el análisis multivariable mantuvieron su significación el índice de Barthel, el índice de Charlson y la creatinina sérica. En los ingresos hospitalarios por IC en el paciente muy anciano, una valoración funcional previa ayuda a identificar a los pacientes de riesgo.

Palabras clave: Insuficiencia cardiaca. Hospitalización. Anciano.

INTRODUCTION

Despite therapeutic advances, the morbidity and mortality associated with heart failure (HF) continues to be considerable, particularly in elderly patients. In fact, most hospitalizations and deaths attributable to HF occur in individuals >65 years of age.¹⁻³

Our aim was to assess the usefulness of adding a functional assessment study (basic and instrumental activities of daily living) in patients >79 years hospitalized for HF, in order to achieve a better understanding of the disease in this elderly patient group.

METHODS

We prospectively evaluated 188 patients >79 years admitted from the emergency department for HF between September 2002 and December 2003. Heart failure was diagnosed according to the Framingham criteria, and signs of left heart failure or cardiomegaly were assessed from the x-ray at admission.⁴ The hospital ethics committee approved the study.

Data were collected on demographics, New York Heart Association (NYHA) functional class, presence of atrial fibrillation, and history of dementia, hypertension, diabetes mellitus, and dyslipidemia. The etiology of HF was established in each case by the investigator in charge; although a patient could have various etiologies, the one considered most important for each specific patient was chosen. The functional capacity for basic activities of daily living was assessed by the Barthel index⁵ 2 weeks before admission, and at the time of discharge. The Barthel index was obtained through interviews with the patient or with the main caregiver when the patient presented

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TABLE 1. Medical history and Initial Clinical Characteristics

Hypertension	139 (74%)
Diabetes mellitus	71 (38%)
Dyslipidemia	41 (22%)
Dementia	30 (16%)
Prior institutionalization	10 (5.3%)
Marital status	
Married	56 (30%)
Widowed	121 (64%)
Single	9 (5%)
Separated	2 (1%)
Etiology	
Hypertensive heart disease	68 (36%)
Ischemic heart disease	62 (33%)
Valve disease	36 (19%)
Other causes (alcoholism, etc)	13 (7%)
Unknown	9 (5%)
Mean systolic blood pressure, mm Hg	150±32
Mean diastolic blood pressure, mm Hg	82±16
Heart rate, bpm	89±25
Serum creatinine, µmol/L	1.3±0.6
Hematocrit	36.1±6.5
Electrocardiogram	
Sinus rhythm	97 (51.6%)
Chaotic atrial rhythm	3 (1.6%)
Rapid atrial fibrillation	59 (31.3%)
Blocked atrial fibrillation	10 (5.3%)
Atrial flutter	4 (2.1%)
Pacemaker	14 (7.4%)
Ventricular tachycardia	1 (0.5%)
Prior echocardiogram	79 (42%)
Preserved ejection fraction (>45%)	46 (58%)

TABLE 2. Comparison Between Deaths and Non-Deaths During Hospitalization*

	Patients Who Died (n=25)	Patients Who Survived (n=163)	P
Age, y	84.4±2.9	84.73±3.6	.65
Women	18 (72%)	108 (66%)	.73
Institutionalized	0 (0%)	10 (6%)	.36
Dementia	7 (28%)	23 (14%)	.11
OARS-IADL	3.8±3.7	7.2±3.9	.0001
Previous Barthel index	64.4±24.7	84.4±19.5	<.00001
Charlson index	3.6±1.9	2.3±1.2	<.0001
MNA-SF	9±2.2	10.1±2.5	.06
Mean systolic blood pressure, mm Hg	147±38	150.1±31	.5
Mean diastolic blood pressure, mm Hg	81±20	82.2±15	.6
Heart rate, bpm	87±18	90±25	.55
Serum creatinine, mmol/L	167.1±70	124.3±58	.001
Hematocrit	32.7±76	36.6±62	.004

*OARS-IADL indicates Older Americans Resource Scale for Instrumental Activities of Daily Living; MNA-SF, Mini-Nutritional Assessment short-form.

cognitive deterioration; the total score varied from 0 (total dependence) to 100 (independence). In order to assess instrumental activities, we used the Older Americans Resource Scale Instrumental Activities of Daily Living (OARS-IADL),⁶ a 7-item scale scored from 0 (total dependence) to 14 (complete independence).

The Charlson comorbidity index⁷ and nutritional risk was obtained using the Mini-Nutritional Assessment-Short Form (MNA-SF),⁸ with a score ranging from 0-14, where <11 identifies the highest risk of malnutrition. The initial values for the heart rate, blood pressure, hematocrit, and serum creatinine were collected. Complete information on all variables studied, except the echocardiogram, was available for all patients.

In the initial descriptive analysis, the results are expressed as mean ± standard deviation (SD). To compare the differences, Student's *t* test was used for quantitative variables and the χ^2 test with Fisher's exact test for qualitative variables. The nonparametric Wilcoxon test was used for dependent samples, in order to evaluate differences in the Barthel index scores. Previously significant variables were used for the logistic regression analysis (forward stepwise method), forcing entry of the age and sex variables. The results were considered significant when $P<.05$.

RESULTS

A total of 188 patients were assessed, 126 (67%) of them women, with a mean age of 84.6±3.5 years. The mean previous Barthel index score was 81.7±21, the mean OARS-IADL was 6.7±4.06, and the mean Charlson index was 2.5±1.4. The mean MNA-SF was 10.1±2.9, and there was nutritional risk in 97 patients.

In 58 patients (31%), admission coincided with diagnosis of the disease; in the remainder, the diagnosis had been made a mean of 3.7±3.6 years earlier. Of these 130 patients, 87 (46%) had been previously hospitalized for HF and 45 (34%) had been admitted or had consulted in the emergency room for this reason within the last three months. Pre-admission NYHA functional class in patients with known HF was 39 patients in Class II (30%), 71 patients in Class III (55%), and 20 patients in Class IV (15%).

Table 1 shows the background and quantified variables at hospitalization.

Twenty-five patients (13%) died, with mortality due to sudden death in 4, progression of the disease in 19, and noncardiac causes in 2. In 13 of those who died due to progression of the disease, the clinical history indicated that the patient was in the terminal phase of HF. Table 2 shows the variables assessed, according to patient death or survival. In the logistic regression analysis, the OARS-IADL ($P=.24$) and hematocrit ($P=.2$) lost significance, whereas the Barthel index,

TABLE 3. Results of Multivariate Analysis of in-Hospital Mortality*

	<i>P</i>	Multivariate OR	95% CI
Charlson index	.03	1.352	1.015-1.802
Previous Barthel index	.0001	0.966	0.948-0.985
Serum creatinine	.008	1.009	1.002-1.005

*CI indicates confidence interval; OR, odds ratio.

Charlson index, and creatinine level remained in the model (Table 3).

The mean Barthel index score of the 163 survivors at the time of hospital discharge was 74.4, significantly lower ($P<.0001$) than the previous value; 7 patients (4.3%) required new institutionalization.

DISCUSSION

It has been reported that 49% of patients with a first diagnosis of HF are under 79 years of age.⁹ Our study evaluates this group of very elderly patients with HF. The initial profile showed a predominance of women, widowed marital status, and low institutionalization.

The impact of HF can decrease the quality of life of elderly patients and cause deterioration of the basic activities of daily living.¹⁰ In fact, a previous low functionality level has been associated with greater mortality (as in our study) and a higher number of rehospitalizations in patients with HF.¹¹

Comorbidity in the elderly patient with HF appears to be higher than in patients from the same age group without HF.¹² In our study, the mean Charlson index was 2.5, below the level of 3.3 reported by Zhang et al.¹² The percentage of hypertensive and diabetic patients is similar to that described in the SEMIIC study² and the percentage of atrial fibrillation is similar to that reported in a group of patients of similar age.³

In-hospital mortality appears to be related to increased age.¹³ Our percentage is identical to the 13% described in institutionalized patients of the same age.³ It has been reported that women with HF are more likely to survive than men in the long-term¹⁴; however, these differences were not confirmed in our study. There was, however, a logical association between deteriorated kidney function and higher mortality.

The presence of functional loss was confirmed at the time of discharge,¹² although the percentage of new institutionalizations was low. One positive observation is that a high percentage of patients who died due to progression of HF in the refractory stage of the disease had been recognized as such in the clinical history; therefore, they were able to benefit from appropriate terminal treatment.¹⁵

As limitations of the study, we mention the low percentage of echocardiograms, as well as the fact that

data on prior treatment for HF were not evaluated because of the large number of cases in which hospitalization coincided with diagnosis of the disease.

In short, in hospital admissions for HF among very elderly patients, a prior functional assessment can help identify patients at higher risk. A multidimensional assessment¹⁶, both during admission and at hospital discharge, would be key to ensuring better treatment for these patients.

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