ORIGINAL ARTICLE

Heart Failure With Preserved Ejection Fraction. Effect of Etiology on Prognosis

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Introduction and objectives. Heart failure with preserved systolic function accounts for almost 40% of heart failure cases. Prognosis is similar to that in patients with a low left ventricular ejection fraction (LVEF). However, it is not clear whether the etiology of heart failure with preserved systolic function has an effect on prognosis.

Methods. We assessed 95 consecutive patients admitted to our hospital with heart failure and a LVEF>45%. Twenty-five (26%) had an ischemic etiology and 70 (74%), a non-ischemic etiology.

Results. The patients' mean age was 73 (6) years, 60% were female, and their mean LVEF was 61 (7)%. These characteristics were similar in the two etiological groups. After a mean follow-up period of 53 (8) months (4-69 months; median 46 months), mortality was higher in ischemic patients (17.88 vs 2.37/100 patient-years; *P*<.0001), as was the rate of cardiovascular admissions (24.58 vs 4.14/100 patient-years; *P*<.0001). The rates of mortality due to heart failure and sudden death were also higher in ischemic patients, at 7.82 vs 0.59/100 patient-years, and 7.82 vs 0.30/100 patient-years, respectively (*P*<.0001). The higher overall admission rate found in the ischemic group was due to higher rates of admission for heart failure (14.53 vs 0.89/100 patient-years; *P*<.0001) and acute coronary syndrome (8.94 vs 1.78/100 patient-years; *P*=.003).

Conclusions. In terms of prognosis, heart failure with preserved systolic function is not a homogeneous disease entity. Morbidity and mortality rates are higher in patients with an ischemic etiology. Moreover, different mechanisms are involved.

Key words: *Heart failure. Systolic function. Ischemic heart disease.*

Insuficiencia cardiaca con función sistólica conservada. Diferencias pronósticas según la etiología

Introducción y objetivos. La insuficiencia cardiaca con función sistólica conservada (ICFSC) parece tener un pronóstico similar al de la insuficiencia cardiaca con función sistólica disminuida. Sin embargo, no se conoce si la ICFSC es una entidad pronóstica homogénea o si su morbimortalidad varía según su etiología.

Métodos. Se ha evaluado a una serie de 95 pacientes diagnosticados consecutivamente de ICFSC, con fracción de eyección mayor del 45%, y hemos comparado los grupos de etiología isquémica (n = 25; 26%) y no isquémica (n = 70; 74%).

Resultados. La edad media fue de 73 ± 6 años, el 60% eran mujeres y la fracción de eyección era del 61 ± 7%, con cifras similares en ambos grupos. Tras un seguimiento de 53 ± 8 meses (límites, 4-69; mediana, 46), el grupo isquémico presentó mayor mortalidad (17,88 frente a 2,37 muertes/100 pacientes/año; p < 0,0001) y mayor incidencia de ingresos cardiovasculares (24,58 frente a 4,14 ingresos/100 pacientes/año; p < 0,0001). La incidencia de muerte por insuficiencia cardiaca crónica (ICC) y de muerte súbita fueron más elevadas en los pacientes isquémicos (7,82 frente a 0,59 y 7,82 frente a 0,30/100 pacientes/año; p < 0,0001). La mayor incidencia de ingresos en el grupo isquémico se debió a la mayor tasa de ingresos por ICC (14,53 frente a 0,89/100 pacientes/año; p < 0,0001) y síndrome coronario agudo (8,94 frente a 1,78; p = 0,003).

Conclusiones. La ICFSC no es una entidad homogénea desde el punto de vista pronóstico. La morbimortalidad es más elevada en los casos de etiología isquémica, y sus mecanismos son también distintos.

Palabras clave: *Insuficiencia cardiaca. Función sistólica. Cardiopatía isquémica.*

INTRODUCTION

Chronic heart failure (CHF) is becoming one of the main morbidity/mortality factors affecting the general population. Its incidence and prevalence continue to rise due to the gradual ageing of the population

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ABBREVIATIONS

LVEF: left ventricular ejection fraction.
CHF: chronic heart failure.

healtha care improvements and survival of patients with chronic diseases. The survival of many heart diseases—of which CHF is the final stage—has also increased.[1,2] It is noteworthy, however, that the CHF morbidity/mortality has not been significantly reduced despite advances in treating heart diseases and the improvements achieved with respect to their long term clinical course. This is probably due to the greater age of the patients with this condition and the comorbidity they commonly experience.[3,4]

It is thought that about 40% of patients with CHF have preserved left ventricular systolic function, a condition more commonly seen in women and older patients.[5,6] Controversy exists over whether such patients have better survival than those with CHF with ventricular systolic dysfunction. Some authors report greater morbidity/mortality among the latter,[5-7] whereas others report no such findings.[8,9] Ojeda et al[10] reported similar survival and hospital readmission rates for cardiac and non-cardiac causes in both types of patient.

From a prognostic point of view it remains to be clarified whether patients with CHF and preserved systolic function are a homogenous group or whether morbidity/mortality varies depending on the etiology of their condition.[11-14] The aim of the present study was to determine whether ischemic or non-ischemic etiology affects the long term prognosis of patients with CHF and preserved systolic function, and to establish whether these etiologies affect the causes and mechanisms of the events suffered.

METHODS

The study subjects were patients discharged consecutively from our unit between January and December 2000 after admission for CHF with preserved systolic function. The diagnosis of CHF was made in agreement with the criteria of the European Society of Cardiology, which include the presence of signs and symptoms of heart failure plus echocardiographic and/or hemodynamic evidence of cardiac structural or functional impairment.[15] The absence of left ventricular systolic dysfunction was determined by echocardiography in all patients. A left ventricular ejection fraction (LVEF) of >45% was required for inclusion (again in agreement with the guidelines of the European Society of Cardiology for the diagnosis of CHF with preserved systolic function).[15] Patients with CHF and preserved systolic function of valvular etiology (a reversible condition requiring surgery-catheterization to correct the cause of decompensation) were excluded, as were those who remained on the heart transplant waiting list.

Patient sociodemographic, clinical, analytical, electrocardiographic and echocardiographic data, plus all treatments administered, were recorded at the time of inclusion and during follow-up. The patients were divided into 2 groups depending on the ischemic or non-ischemic etiology of their condition. This was deemed ischemic when the patient had a history or showed electrocardiographic evidence of myocardial infarction, angiographic evidence of significant coronary lesions, and/or showed signs of ischemia in non-invasive tests (echocardiography with dobutamine or myocardial perfusion gammagraphy) during the hospital stay leading to enrollment. When ischemic heart disease was identified, the etiology of the CHF was always attributed to this problem even though other possible causes (e.g., high blood pressure) were present. In patients with no history of ischemic heart disease, echocardiography with dobutamine or myocardial perfusion gammagraphy and/or coronary angiography were performed to rule out coronary disease. When thus coronary artery disease was ruled out, the etiology of the CHF was deemed to be high blood pressure in patients with a known history of hypertension, as well as in those in whom this problem was discovered during their hospital stay.

The incidence of events (morbidity and mortality) was recorded in both the ischemic and non-ischemic etiology groups, and the overall mortality, cardiac mortality, non-cardiac mortality, and readmission to hospital because of heart failure and other causes compared. The causes and mechanisms of the events in both groups of patients were determined. All patients were monitored prospectively during outpatient consultations at our center (the frequency determined by each patient's needs). When a patient failed to attend an appointment he/she was contacted by telephone. No patients were lost to follow-up. The final consultation (with respect to data collection) took place between June and October of 2005 (either in person or by telephone). The mean follow-up time for the entire group of patients was 53±8 months (range, 4-69 months; median, 46 months), 58±6 months (range, 8-69 months; median, 55 months) for the non-ischemic etiology patients, and 43±11 months (range, 4-67 months; median, 37 months) for those whose condition was of ischemic etiology.

Statistical Analysis

Qualitative variables are shown as percentages and quantitative variables as means±SD. The former were compared using the χ^2 or Fishers exact test. Continuous variables (all of which showed a normal distribution) were compared using the Student *t* test.