



ORIGINAL ARTICLE

## Clinical characteristics and one-year mortality according to admission renal function in patients with a first acute heart failure hospitalization



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### KEYWORDS

Heart failure;  
Chronic kidney disease;  
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### Abstract

**Introduction and Objectives:** Chronic kidney disease is related to poor outcomes in patients with heart failure (HF). Few studies have assessed whether renal function influences one-year mortality risk in patients admitted for the first time for acute HF.

**Methods:** We reviewed the medical records of all patients aged >50 years admitted within a two-year period for a first episode of decompensated HF. The sample was divided according to the patients' estimated glomerular filtration rate (eGFR) on admission into three groups (eGFR >60, 30-60 and <30 ml/min/1.73 m<sup>2</sup>). Index admission and one-year all-cause mortality rates were compared between groups using Cox regression analysis.

**Results:** A total of 985 patients were included in the study, mean age 78.4±9 years, and with mean admission eGFR of 60.5±26 ml/min/1.73 m<sup>2</sup>. Of these, 516 (52.3%) patients had eGFR <60 ml/min/1.73 m<sup>2</sup>. One-year all-cause mortality was 25.4%, with a significant association between worse eGFR category and mortality (p<0.0001). Cox regression analysis assessing eGFR as a categorical variable confirmed this association (HR 1.378; p=0.030), together with older age (HR 1.066; p<0.001), previous diagnosis of hypertension (HR 0.527; p<0.001), and both lower systolic blood pressure (HR 0.993; p=0.009) and higher serum potassium on admission (HR 1.471; p<0.001).

**Conclusions:** Renal impairment is common in HF patients, even at the time of first admission. In this group of HF patients the presence of renal impairment was associated with higher mid-term (one-year) mortality risk.

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**PALAVRAS-CHAVE**

Insuficiência cardíaca;  
Doença renal crónica;  
Hospitalização;  
Readmissão;  
Mortalidade

## Características clínicas e mortalidade a um ano de acordo com a função renal à admissão, em doentes com a primeira hospitalização por insuficiência cardíaca aguda

**Resumo**

**Introdução e objetivos:** A doença renal crónica (CKD) está relacionada com um pior prognóstico em doentes com insuficiência cardíaca (HF). Poucos estudos avaliaram se a função renal influencia o risco de mortalidade a um ano, em doentes admitidos pela primeira vez por insuficiência cardíaca aguda.

**Métodos:** Revimos os registos médicos de todos os doentes > 50 anos, admitidos num período de dois anos por um primeiro episódio de descompensação de HF. Dividimos a amostra de acordo com a taxa de filtração glomerular estimada dos doentes (eGFR) após a admissão em três grupos (eGFR >60, 30-60 e <30 ml/min/1,73 m<sup>2</sup>). Comparamos a admissão inicial e as taxas de mortalidade por todas as causas num ano, com análises de regressão de Cox.

**Resultados:** Foram incluídos 985 doentes no estudo, a média foi de 78,4 ± 9 anos e a eGFR média na admissão foi de 60,5 ± 26. Do total, 516 (52,3%) doentes apresentaram eGFR < 60. A um ano, a taxa de mortalidade por todas as causas foi de 25,4%, com uma associação significativa entre a pior categoria eGFR e a taxa de mortalidade (p < 0,0001). A análise de regressão de Cox que avaliou a eGFR como variável categórica confirmou essa associação (HR 1,378; p = 0,030) juntamente com idade avançada (HR 1,066; p < 0,001), diagnóstico prévio de hipertensão (HR 0,527; p < 0,001) e pressão arterial sistólica inferior (HR 0,993; p = 0,009) e maiores valores de potássio sérico após a admissão (HR 1,471; p < 0,001).

**Conclusões:** A insuficiência renal é comum em doentes com insuficiência cardíaca, mesmo no momento da primeira admissão. Nesse grupo de doentes com insuficiência cardíaca a presença de insuficiência renal está associada a um maior risco de mortalidade em médio prazo (um ano).

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**Introduction**

The prevalence of heart failure (HF) increases with age, and so does the prevalence of comorbidities, including chronic kidney disease (CKD).<sup>1</sup> Worsening renal function is considered to be a sensitive marker of decreased organ perfusion, and is an important independent predictor of increased mortality and hospitalization in patients with chronic or acute HF.<sup>2</sup>

Glomerular filtration rate is the most commonly used and best overall marker of renal function. Renal dysfunction, defined as an estimated glomerular filtration rate (eGFR) of <60 ml/min/1.73 m<sup>2</sup>, is found in two-thirds of patients admitted to hospital with acute HF,<sup>3</sup> with varying rates depending on the type of acute HF patients studied. The presence of renal dysfunction in such patients is a marker of poor prognosis in terms of both mortality and readmission for worsening HF.<sup>4-8</sup> Most studies have assessed this relationship only in patients with HF with reduced ejection fraction (HFrEF) or who have previously been hospitalized for acute HF. Fewer studies have focused on patients with preserved ejection fraction (HFpEF) or in the early stages of HF.<sup>9,10</sup>

To shed more light on the role of renal dysfunction in acute HF, this study aimed to investigate the potential impact of impaired baseline renal function, defined as eGFR <60 ml/min/1.73 m<sup>2</sup>, on the risk of one-year mortality in the subset of real-world HF patients (regardless of type of ventricular dysfunction) undergoing their first admission for HF decompensation.

**Methods****Patient selection and study design**

This retrospective study was performed in the Hospital Universitari de Bellvitge, a 750-bed tertiary-care public hospital for adults from Barcelona, Spain. Administrative data were retrieved regarding all 1333 admissions to our hospital within a 24-month period (January 2013-December 2014) with HF as the primary discharge diagnosis (identified by the ICD 9-CM codes 398.91, 402.91, 404.01, 404.03, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43 and 428.9). Following this first selection, a thorough review of all these patients' medical records was undertaken in order to select only those who (a) fulfilled clinical criteria for acute HF and (b) were undergoing their first ever admission due to a first episode of acute HF (those who had already been discharged with a primary or secondary diagnosis of HF were excluded). We also excluded patients younger than 50 years; those in stage 5 CKD undergoing renal replacement therapy; kidney or heart transplant recipients; those already receiving palliative therapy for any cause; patients whose acute HF episode was secondary to an acute coronary syndrome; patients with cirrhosis, ascites or nephrotic syndrome; and patients discharged directly home within 24 hours or transferred to other acute care hospitals from the emergency department. Any doubts regarding a

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