Mortality in patients with heart failure discharged from an Emergency Department: prognostic factors

Factores pronósticos de mortalidad a largo plazo pacientes con insuficiencia cardiaca dados de alta desde el Servicio de Urgencias

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Ethical Responsibilities:
All authors have confirmed their authorship, the nonexistence of external funding, and the maintenance of confidentiality and respect for patients' rights in the author's responsibilities document, publication agreement, and assignment of rights to Revista Española de Urgencias Emergencias.

Editor in Charge:
Fernando Rosell Ortiz.

Acute heart failure (AHF) is one of the most prevalent and incident conditions in emergency departments (EDs), particularly among patients older than 75 years,[1] where it represents the leading cause of ED consultation.[2] Patients with AHF and advanced age who are treated in the ED for an episode of AHF present multiple comorbidities, frailty, and adverse events during follow-up.1 In this patient profile, several factors associated with a higher rate of 30-day post-discharge events have been evaluated; however, evidence regarding mortality beyond the first 30 days after hospital discharge is more limited.

The objective of this study was to determine possible prognostic parameters from routine clinical practice to identify those patients at greater risk of mortality during follow-up. The study was approved by the Ethics Committee of the *Hospital Universitario de Canarias* (Tenerife, Canary Islands, Spain).

We designed a retrospective cohort study including patients discharged from the ED with a diagnosis of AHF between July 1st, 2019, and December 31st, 2019. Various demographic parameters and routine clinical variables, mean length of stay, and precipitating cause were evaluated. Statistical analysis compared the different variables between the group that died during follow-up and the group that survived 1 and 3 years after discharge. The Mann-Whitney U test was used for nonparametric quantitative variables, and the chi-square test for qualitative variables. Comparisons with statistically significant differences ($P < .05$) were included in a multivariable logistic regression analysis. Statistical analysis was performed using Stata Statistical Software: Release 14 (College Station, TX: StataCorp LP).

We identified a total of 343 patients discharged from the ED with a diagnosis of AHF; episodes of AHF decompensation occurring after the index event were excluded to assess time to death from the first episode in each patient (78 patients excluded). A total of 265 patients were included. The median age was 84 years [interquartile range (IQR), 78–88], and 163 were women (61.5%). Baseline characteristics are shown in Table 1. Older patients, those with higher NT-proBNP and creatinine levels, and those with a past medical history of chronic kidney disease exhibited higher mortality both at 1 year and at 3 years following ED discharge (Table 1). Multivariable analysis showed that older patients also had higher mortality at both 1 and 3 years after discharge, and those with higher creatinine levels had higher 1-year mortality (Tables 2 and 3).

EDs are typically the main access point to the health care system for patients with AHF, who tend to be of advanced age. For example, in 2015 the EAHFE registry reported a mean age of 79 years in this population, and 56% were women.[1] Our cohort had a median age of 84 years, likely because more fragile patients without structural heart disease were not admitted to cardiology or internal medicine services and were instead managed and discharged directly from the ED. The 1-year mortality rate was 37%, and the 3-year mortality rate, 65%. This reflects that the AHF population treated in EDs consists of elderly patients with multiple comorbidities and marked frailty. Frailty in these patients is associated with a threefold increase in the risk of HF-related readmission or death within 1 year of discharge.[2]

At 30 days after hospitalization for AHF, a Charlson index > 3 and malnutrition triple the mortality risk in these patients.[3,4] In fact, the ISAR scale may be useful to predict mortality in frail patients.[5,6] High-risk criteria in older patients with AHF in EDs are associated with worse 30-day outcomes, and the results of the DEED-FRAIL clinical trial evaluating strategies to reduce events in frail patients discharged from EDs will soon be available.[7,8]

Table 1. Baseline characteristics of patients discharged from the emergency department after an episode of acute heart failure and univariate analysis according to 1-year and 3-year mortality

	Total population N = 265 n (%)	1-year mortality yes N = 96 n (%)	1-year mortality no N = 169 n (%)	*P*	3-year mortality yes N = 171 n (%)	3-year mortality no N = 94 n (%)	*P*
Age*	84 (78-88)	85 (81-89)	81 (75-86)	< 0.001	85 (80-89)	81 (75-86)	< .0001
Female	163 (61.5)	59 (61.4)	104 (61.5)	0.9	65 (60)	37 (62.3)	.82
Decompensating comorbidity	187 (70.5)	64 (66.6)	123 (72.7)	0.29	123 (71.9)	64 (68.1)	.51
Length of stay (days)*	1.8 (1.1-2.9)	1.7 (1.1-3.1)	1.7 (1.1-2.8)	0.72	1.9 (1.1-3.1)	1.5 (0.9-2.5)	.02
HTN	217 (81.9)	78 (81.2)	139 (82.2)	0.30	142 (83)	75 (79.8)	.51
DM	130 (49.1)	43 (44.7)	87 (51.5)	0.29	82 (47.9)	48 (51.1)	.62
CKD†	97 (36.6)	47 (48.9)	50 (29.6)	0.002	73 (42.7)	24 (25.5)	.006
AF	153 (57.7)	52 (54.2)	101 (59.8)	0.38	106 (61.9)	47 (50)	.059
Chronic ischemic heart disease	78 (29.4)	29 (30.2)	49 (28.9)	0.83	53 (30.9)	25 (26.6)	.45
Creatinine*	1.12 (0.86-1.50)	1.30 (0.99-1.93)	1.03 (0.81-1.38)	< 0.0001	1.20 (0.90-1.58)	0.99 (0.84-1.32)	.01
NT-proBNP*	4,261 (2,296-8,265)	5,162 (2,767-12,937)	3,958 (2,166-6,860)	0.003	5,130 (2,789-11,502)	2,963 (1,890-5,943)	< .0001

*Data expressed n (%) for dichotomous variables and as median (interquartile range) for continuous variables with non-normal distribution.
HTN: hypertension; DM: diabetes mellitus; AF: atrial fibrillation; COPD: chronic obstructive pulmonary disease; CKD: chronic kidney disease; CIHD: chronic ischemic heart disease.
†Chronic kidney disease defined as an estimated glomerular filtration rate < 60 mL/min/1.73 m^2.

Table 2. Logistic regression analysis using 1-year all-cause mortality after hospital discharge as the dependent variable

	OR	95% CI	*P*
Age	1.05	1.02-1.09	.004
CKD	1.03	0.51-2.10	.93
Creatinine	2.52	1.35-4.51	.004
NT-proBNP	1.00	1.00-1.00	.04

CI: confidence interval; OR: odds ratio; CKD: chronic kidney disease.

Table 3. Logistic regression analysis using 3-year all-cause mortality after hospital discharge as the dependent variable

	OR	95% CI	*P*
Age	1.09	1.05-1.13	< .001
CKD	1.28	.59-2.79	.53
Creatinine	1.41	.69-2.92	.35
NT-proBNP	1.00	1.00-1.00	.001
Median length of stay (days)	1.08	0-95-1.23	.21

CI: confidence interval; OR: odds ratio; CKD: chronic kidney disease.

The main limitations of our study are its retrospective design and the absence of routine frailty assessment in our ED. The only variables that predicted long-term mortality were age and serum creatinine. This is likely because other parameters linked to frailty—parameters that could help better identify patients at higher risk of mortality—were not routinely collected. Indeed, geriatric variables such as loss of appetite, acute confusional syndrome, or severe functional dependence have been shown to predict 30-day mortality.[3]

In conclusion, serum creatinine is the most robust clinical variable for predicting 1-year mortality, and age is the main prognostic variable at both the 1- and 3-year follow-up. It is essential to accurately identify vulnerable and frail patients to reduce fatal events through structured follow-up and a multidisciplinary approach after an AHF episode in the ED.

Note of the editors: This is a BOWMAN-generated English translation of the officially indexed Spanish-language article, which should be cited as Rev Esp Urg Emerg. 2023;2:239-240. In this translated version, the editors have supervised the process; however, it cannot be ruled out that some errors resulting from the artificial intelligence translation process may have gone unnoticed.

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