

Predicting 30-Day Mortality for Patients With Acute Heart Failure in the Emergency Department: A Cohort Study.

Abstract

Background:

Physicians in the emergency department (ED) need additional tools to stratify patients with acute heart failure (AHF) according to risk.

Objective:

To predict mortality using data that are readily available at ED admission.

Design:

Prospective cohort study.

Setting:

34 Spanish EDs.

Participants:

The derivation cohort included 4867 consecutive ED patients admitted during 2009 to 2011. The validation cohort comprised 3229 patients admitted in 2014.

Measurements:

88 candidate risk factors and 30-day mortality.

Results:

Thirteen independent risk factors were identified in the derivation cohort and were combined into an overall score, the MEESSI-AHF (Multiple Estimation of risk based on the Emergency department Spanish Score In patients with AHF) score. This score predicted 30-day mortality with excellent discrimination (c-statistic, 0.836) and calibration (Hosmer-Lemeshow $P = 0.99$) and provided a steep gradient in 30-day mortality across risk groups (<2% for patients in the 2 lowest risk quintiles and 45% in the highest risk decile). These characteristics were confirmed in the validation cohort (c-statistic, 0.828). Multiple sensitivity analyses did not find important amounts of confounding or bias.

Limitations:

The study was confined to a single country. Participating EDs were not selected randomly. Many patients had missing data. Measurement of some risk factors was subjective.

Conclusion:

This tool has excellent discrimination and calibration and was validated in a different cohort from the one that was used to develop it. Physicians can consider using this tool to inform clinical decisions as further studies are done to determine whether the tool enhances physician decision making and improves patient outcomes.

Primary Funding Source:

Instituto de Salud Carlos III, Spanish Ministry of Health; Fundació La Marató de TV3; and Catalonia Govern.