

Recurrent heart failure hospitalizations in patients with preserved ejection fraction: Predictors and Outcome

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BACKGROUND

Heart failure with preserved ejection fraction (HFpEF) is the most common form of HF and its prevalence is approaching epidemic proportions. Current treatment strategies aim to improve clinical status and reduce mortality rates. Episodes of acute HF are one of the main reasons for hospitalization in people over 65 years; however, they have not been well studied in HFpEF patients yet.

OBJECTIVES

The aim of this study was to investigate the impact of recurrent HF hospitalizations on long-term outcomes and to find predictors for subsequent events.

METHODS

Between December 2010 and December 2019, 422 patients with confirmed HFpEF were enrolled in this study and prospectively followed.

RESULTS

During follow-up, 134 patients (32%) experienced HF hospitalizations during follow-up with a median frequency of 2 admissions (IQR: 1-4). Those presenting with recurrent hospitalizations had worse performance in 6-minute walk test ($p = 0.027$), higher levels of N-terminal prohormone of brain natriuretic peptide (NT-proBNP, $p < 0.001$), and a larger proportion suffered from New York Heart Association functional class \geq III ($p < 0.001$); there was also a tendency to a greater need for diuretic therapy at baseline ($p = 0.086$). Patients with HF hospitalizations were characterized by a high rate of comorbidities, with a particularly higher burden of anemia ($p < 0.001$) in patients with subsequent events. Furthermore, baseline left ventricular filling pressures (Left ventricular end diastolic pressure; $p = 0.005$) as well as right ventricular afterload (Pulmonary arterial systolic pressure; $p < 0.001$) were more pronounced in patients with recurrent deteriorations.

Over the observation period 107 patients (25%) died. Kaplan-Meier curves revealed increasingly worse survival in patients with recurrent HF events (1-year survival: 1 HF event 91.6% vs >1 HF events 91.8%, 3-years survival: 1 HF event 84.7% vs >1 HF events 68.3%, 5-years survival: 1 HF event 67.4% vs >1 HF events 42.7%, $p < 0.04$; Figure 1).

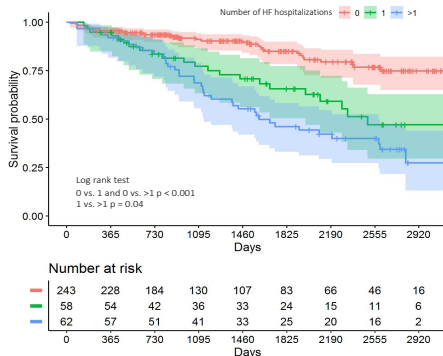


Figure 1. Kaplan Meier Plot

We calculated a prediction model which revealed significant predictive capability for all cause survival and included the following variables: age (HR 1.03, 95% CI: 1.00-1.06, $p = 0.028$), BMI (HR 0.97, 95% CI: 0.93-1.01, $p = 0.108$), NYHA class (HR 1.77, 95% CI: 1.22-2.59, $p = 0.003$), presence of COPD (HR 1.41, 95% CI: 0.92-2.16, $p = 0.115$), need for diuretic therapy (HR 1.47, 95% CI: 0.91-2.38, $p = 0.118$), left atrial volume index (HR 1.02, 95% CI: 1.00-1.03, $p = 0.011$), NT-proBNP (HR 1.08, 95% CI: 1.02-1.14, $p = 0.012$), and status of previous hospitalizations (HR 1.51, 95% CI: 1.13-2.02, $p = 0.005$).

The predictive model is visualized by a nomogram, which shows the distribution of each variable and its influence on the outcome (Figure 2).

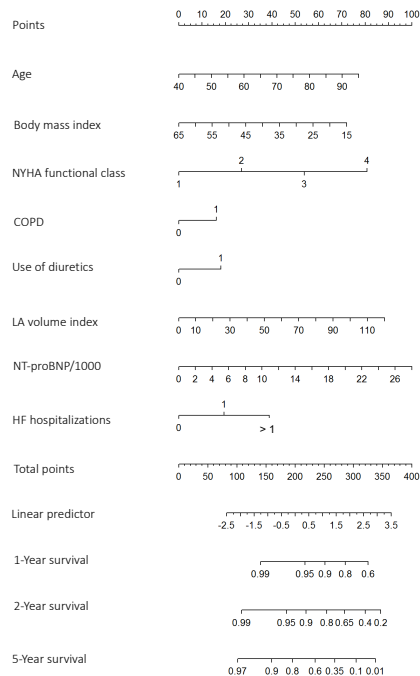


Figure 2. Prediction model for all cause mortality

Given the strong association between overall survival and number of hospitalizations (log-rank test $p > 0.001$), the predictive model score was further tested to predict future HF hospitalizations. Logistic regression analysis revealed that for patients with an increase of 1 in the prediction score, the probability of being hospitalized at least once increases by a factor of 2.85 (95% CI: 2.17-3.81, $p < 0.001$; Figure 3).

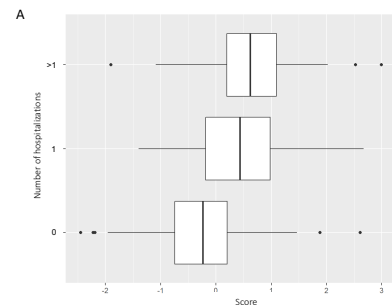


Figure 3. Prediction probabilities for future HF hospitalizations. Prediction model score stratified by number of HF hospitalizations.

CONCLUSIONS

HFpEF patients experiencing recurrent HF hospitalizations have worse long-term outcome. Intensive efforts should be made to maintain HFpEF patients compensated over time. We developed a simple model to better identify HFpEF patients at increased risk for both death and HF hospitalization.