

# One-year outcome in patients with heart failure with mid-range ejection fraction hospitalized due to worsening heart failure

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**Background:** Heart failure (HF) comprises a wide range of patients (pts), from those with normal to those with reduced left ventricular ejection fraction (LVEF). According to 2016 European Society of Cardiology (ESC) HF guidelines, pts with LVEF in the range of 40-49% represent a "grey area," which is defined as heart failure with mid-range ejection fraction (HFmrEF). Little is known about the clinical characteristics and prognosis in the HFmrEF group.

**Purpose:** Our aim was to determine the incidence of HFmrEF in the group of pts acutely hospitalized due to worsening heart failure as well as to assess the prognosis and prognostic factors in this group.

**Method:** This study was based on two multicenter prospective observational surveys of the ESC: ESC-HF Pilot Survey and ESC-HF Long-Term Registry conducted in 211 European cardiology centers, including 35 centers from Poland. The current study included Polish pts from both ESC registries, admitted to hospital for new-onset or worsening HF. Pts were divided into three groups based on LVEF: the HFpEF group (LVEF  $\geq$ 50%), the HFmrEF group (40-49%) and the HFrEF group (<40%). We compared in-hospital and one-year outcomes in all 3 groups. The primary endpoint was all-cause death at one year. The secondary endpoint was a composite of all-cause death and hospital readmission for HF worsening at one year. We assessed the frequency of the primary and the secondary endpoints and their predictors in the HFpEF, HFmrEF and HFrEF group.

**Results:** We included 1306 pts. 230/1306 pts with HFmrEF represented 17,6%, 340/1306 HFpEF 26,0% and 736/1306 HFrEF 56,4% of the whole analyzed group. Median LVEF in HFmrEF was 43% (40-45). Median hospitalization length was 7 (4-11) days. 10,7% HFmrEF pts met the primary endpoint, comparing to 17,5% in HFrEF and 14,4% in HFpEF ( $p=0,02$ ) pts. 33,7% met the secondary endpoint, comparing to 41,1% and 30,3% for HFrEF and HFpEF respectively ( $p=0,09$ ). A history of revascularization (PCI or CABG) and NYHA class at admission were predictors of the primary (HR 0,11; 95%CI 0,01-0,85,  $p=0,04$  and HR 2,58; 95%CI 1,14-5,82,  $p=0,02$  respectively) and secondary (HR 0,11; 95%CI 0,01-0,91,  $p=0,04$  and HR 1,77; 95%CI 1,13-2,77,  $p=0,01$  respectively) endpoints, while male gender was a predictor for the secondary endpoint (HR 0,47; 95%CI 0,28-0,79,  $p=0,01$ ) in HFmrEF.

**Conclusions:** Patients with HFmrEF represent one sixth (17,6%) of all HF patients hospitalized due to acute decompensation. 34% of HFmrEF either died or were rehospitalized in one year and 11% died in 12 months. Revascularization in the past was associated with a more favorable patients' outcome.