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# Change in left ventricular ejection fraction and outcome in heart failure patients with mid-range ejection fraction: from the HIJ-HF prospective study

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**Introduction:** Heart failure (HF) is categorized on the basis of the left ventricular ejection fraction (LVEF). The European Society of Cardiology has proposed mid-range EF (HFmrEF) as a new category of HF that includes patients with an LVEF of 40–49%. However, the clinical characteristics, change in LVEF following treatment, and outcome of patients with HFmrEF remain clear.

**Methods:** We conducted a prospective observational study of Japanese hospitalized HF patients between 2015 and 2018 at a single-center (HIJ-HF III). HFmrEF was defined as 40–49% of LVEF on echocardiography at admission. We followed these patients and performed echocardiography to assess LVEF per year after hospital discharge. Clinical outcome was death from any cause.

**Methods and results:** We studied 138 patients with HFmrEF (median age 71 years, 69% male). They had 32% of ischemic heart disease, 9% of New York Heart Association functional class III or IV at discharge. During median follow-up of 20 [13–28] months, we assessed change in LVEF for 110 patients with HFmrEF. One year after hospital discharge, 49 patients (44%) improved LVEF ( $\geq 50\%$ ) and 21 patients (19%) reduced LVEF ( $<40\%$ ). HFmrEF patients who reduced LVEF ( $<40\%$ ) were significantly higher mortality rate than those who improved LVEF ( $\geq 50\%$ ) (14% vs. 2%,  $p < 0.05$ ) (Figure).

**Conclusions:** This study demonstrated that 44% of HFmrEF patients improved LVEF following treatment but 19% patients reduced LVEF. Reduced LVEF was associated with poor prognosis.

Figure. The number of dead and survived HFmrEF patients divided by LVEF 1 year after hospital discharge.

