

# Establishment and validation of a prediction model for non-recovery of left ventricular ejection fraction in acute myocardial infarction

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**Introduction:** Acute myocardial infarction (AMI) can result in long-term left ventricular remodeling that alters its dimensions and function. These changes are critical prognostic factors for mortality following AMI. Since not all patients experience left ventricular dysfunction after AMI, the aim of our study was to identify the predictors that contribute to the non-recovery of left ventricular ejection fraction (LVEF).<sup>1,2</sup>

**Patients and Methods:** A single-centre analysis included 925 patients who were followed from their hospitalization for acute coronary syndrome (ACS) up to one year after, during the period from December 2016 to June 2023.

**Results:** The median age was 63 years (interquartile range IQR: 55-70) and 71% were men. The median LVEF was 55% (IQR: 50-60), at discharge and after one year. The median left ventricle end-diastolic diameter (LVEDD) at time of ACS was 52mm (IQR: 47-55). After one year of follow up, patients were categorized into two groups: patient with non-recovery of LVEF (69%) and those with recovery of systolic function by  $\geq 5\%$  (31%). Among patients with ST-elevation myocardial infarction (STEMI), 65% did not recover LVEF, while 72% of patients with non-ST-elevation myocardial infarction (NSTEMI) failed to recover systolic function. Additionally, 72% of patients with NSTEMI, those with recurrent acute coronary event, left anterior descending artery (LAD) involvement and increased LVEDD showed no recovery of systolic function after one year (all  $P < 0.05$ ). With a multivariate logistic regression model analysis, LVEDD (OR 1.01, CI 1.002-1.027,  $P = 0.02$ ) and LAD involvement (OR 1.44, CI 1.044-1.986,  $P = 0.02$ ) were identified as significant individual predictors of poor LVEF recovery. Although ACS type, troponin levels, and previous AMI did not individually predict outcomes, when combined with LVEDD, these factors provided important prognostic information for predicting weaker systolic function recovery ( $P = 0.003$ ).

**Conclusion:** This study shows that LVEDD and LAD involvement have a small, but statistically significant impact of predicting poorer LVEF recovery as individual factors. When combined with other risk factors, specifically LVEDD, they become strong predictors, highlighting the importance of comprehensive approach.

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## LITERATURE

1. Pfeffer MA, Braunwald E. Ventricular remodeling after myocardial infarction. Experimental observations and clinical implications. *Circulation.* 1990 Apr;81(4):1161-72. <https://doi.org/10.1161/01.CIR.81.4.1161>
2. Yang Y, Dong YZ, Hou AX, Liu P, He JW, Chen JY, et al. Establishment and validation of a prediction model for nonrecovery of left ventricular ejection fraction in acute myocardial infarction patients combined with decreased left ventricular ejection fraction. *Clin Cardiol.* 2024 Feb;47(2):e24212. <https://doi.org/10.1002/clc.24212>