Low chronotropic index predicts rehospitalization in post-acute myocardial infarction patients with preserved or mildly reduced left ventricular ejection fraction

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Background: There are limited data about the clinical utility of combined stress echocardiography and cardiopulmonary exercise testing (CPET-ESE) in predicting prognosis in patients after acute myocardial infarction (AMI) with preserved left ventricular ejection fraction (LVEF).

Aim: To assess prognostic parameters using CPET-ESE in post-AMI patients with preserved or mildly reduced LVEF.

Methods: Eighty-seven patients after the first AMI with LVEF >40% were followed for 2 years (median 1.93 years IQR 1.16–2.41). The composite end-point was all-cause mortality or rehospitalization due to ischaemic heart disease (AMI, unstable angina, percutaneous coronary intervention/coronary artery bypass grafting) or heart failure exacerbation. All patients underwent symptom-limited CPET-ESE on a semi-supine cycle ergometer 3 to 5 weeks after AMI. The chronotropic index was calculated as the percent of heart rate reserve. Six patients refused to complete the survey and they were not included in the analysis.

Results: Follow-up was conducted in 81 consecutive patients (mean age 59±10 years, 62% males, 50% AMI with ST-segment elevation, 85% on beta-blockers). Mean LVEF was 56±9% and peak VO2 18.5±5.0 mL/kg/min. There were no deaths during follow-up. The composite end-point occurred in 13 patients. In multivariate Cox regression analysis after correction for demographic and clinical variables, only chronotropic index correlated with the composite end-point (HR 0.93, 95% CI 0.87–0.99, p=0.026). A positive predictive value of 33.3% and a negative predictive value of 91.3% (sensitivity 61.5%, specificity 76.5%, area under the curve, AUC 71%) for predicting the composite end-point was established for the chronotropic index ≤36.8% (Fig. 1). There was a statistically significant difference in the composite end-point occurrence (p<0.01) between subgroups with the chronotropic index above and below that threshold (Fig. 2).

Conclusions: In patients after the first AMI with preserved or mildly reduced left ventricular systolic function, a lower chronotropic index is a predictor of rehospitalization in 2-year follow-up.