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Prognostic value of post-exercise oxygen uptake kinetics in heart failure with preserved ejection fraction

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Objectives: Cardiopulmonary exercise testing (CPET) is a well known prognostic tool in chronic heart failure (CHF). Recent data indicate high predictive value of oxygen uptake (VO2) kinetics following exercise test in patients with CHF. The aim of this study was to confirm prognostic significance of VO2 recovery delay (VO2RD) in HF with preserved ejection fraction (HFpEF).

Methods: We retrospectively analyzed the subgroup of 47 patients with HFpEF, NYHA classes II-III (33 male, mean age 64.2±11.7 years) previously included in the prospective observational study. At baseline the patients underwent comprehensive investigation including CPET. VO2RD defined as time from the end of loaded exercise until permanent fall of VO2 below VO2 peak values, was used for estimation of VO2 recovery kinetics. Average follow-up amounted 34 months. Composite end-point of cardiovascular death and hospitalization for HF decompensation was considered a primary analysis variable.

Results: Cardiovascular mortality amounted 23.4% (n=11). Composite end-point was observed in 57.4% of patients (n=27). ROC-analysis demonstrated significant independent predictive value of VO2RD for composite end-point (AUC=0.868; 95%CI=0.726 to 0.953; p<0.0001). Patients were subsequently dichotomized by a VO2RD of 25 seconds used previously as a cut-off point [Bailey CS. JACC Heart Failure 2018]. Kaplan–Meier analysis confirmed prognostic relevance of VO2RD for composite end-point (hazard ratio = 3.3; 95%CI = 1.4- 7.5, Logrank p = 0.0039).

Conclusion: Prolonged post-exercise VO2 recovery delay indicates unfavorable prognosis and may be used as an independent non-invasive marker for risk stratification in chronic heart failure patients with preserved ejection fraction.