A simplified method to analyze cardiopulmonary exercise test

C. Carriere, U. Corrà, M. Piepoli, A. Bonomi, M. Merlo, S. Barbieri, E. Salvioni, S. Binno, M. Mapelli, F. Righini, F. De Martino, S. Sciomer, C. Vignati, F. Moscucci, F. Veglia, G. Sinagra, P. Agostoni

Abstract

Background:
We evaluated the prognostic meaning of the simple presence or absence of identifiable anaerobic threshold (AT) and respiratory compensation point (RCP) at cardiopulmonary exercise tests (CPETs) performed with a maximal incremental exercise protocol.

Methods:
In the present multicenter study, we retrospectively analyzed data in 1,995 patients with heart failure with reduced ejection fraction (HFrEF). All underwent clinical and laboratory evaluation, echocardiography, and maximal CPET at baseline. The analysis was performed according to absence of identified AT and RCP (group 1: n = 292; 15%), presence of AT but absence of identified RCP (group 2: n = 920; 46%), and presence of both AT and RCP (group 3: n = 783; 39%). The study end point was the composite of cardiovascular mortality, urgent heart transplant, and left ventricular assist device implantation.

Results:
Median follow-up was 2.97 years (interquartile range, 1.50-5.35 years). Eighty-seven (30%), 169 (18%), and 111 (14%) events were observed in groups 1, 2, and 3, respectively (P = .025). Compared with results in group 3 (patients with the best survival), the likelihood of reaching the study end point increased 2.7 times when neither AT nor RCP were identified (hazard ratio, 2.74) and 1.4 times when only AT was identified (hazard ratio, 1.4). Moreover, adding the presence or absence of identified AT and RCP improved the prognostic power of peak oxygen uptake because a significant reclassification was obtained.

Conclusions:
AT and RCP identification has a potential role in the prognostic stratification of HFrEF.