

PETCO₂ gradient: a novel prognostic parameter in cardiopulmonary exercise testing

I.D. Poveda Pinedo, I. Marco Clement, O. Gonzalez, I. Ponz, A.M. Iniesta, L. Pena, M.J. Rodriguez, M.D. Hernandez, H. Arranz, A. Araujo, M. Marin, S. Espinosa, R. Dalmau, A. Castro, J.L. Lopez Sendon

University Hospital La Paz, Madrid, Spain

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Background: Previous parameters such as peak VO₂, VE/VCO₂ slope and OUES have been described to be prognostic in heart failure (HF). The aim of this study was to identify further prognostic factors of cardiopulmonary exercise testing (CPET) in HF patients.

Methods: A retrospective analysis of HF patients who underwent CPET from January to November 2019 in a single centre was performed. PETCO₂ gradient was defined by the difference between final PETCO₂ and baseline PETCO₂. HF events were defined as decompensated HF requiring hospital admission or IV diuretics, or decompensated HF resulting in death.

Results: A total of 64 HF patients were assessed by CPET, HF events

occurred in 8 (12.5%) patients. Baseline characteristics are shown in table 1. Patients having HF events had a negative PETCO₂ gradient while patients not having events showed a positive PETCO₂ gradient (−1.5 [IQR −4.8, 2.3] vs 3 [IQR 1, 5] mmHg; p=0.004). A multivariate Cox proportional-hazards regression analysis revealed that PETCO₂ gradient was an independent predictor of HF events (HR 0.74, 95% CI [0.61–0.89]; p=0.002). Kaplan-Meier curves showed a significantly higher incidence of HF events in patients having negative gradients, p=0.002 (figure 1).

Conclusion: PETCO₂ gradient was demonstrated to be a prognostic parameter of CPET in HF patients in our study. Patients having negative gradients had worse outcomes by having more HF events.

Baseline characteristics

Age, years	59.8±13.7
Male, n (%)	46 (71.9)
HFpEF, n (%)	16 (25)
HFmrEF, n (%)	5 (7.8)
HFrfEF, n (%)	43 (67.2)
Ischaemic heart disease, n (%)	31 (48.4)
LVEF, %	41.0±16.0
Lung disease, n (%)	9 (14.1)
CrCl, mL/min	73.4±16.9
NT-proBNP, pg/ml	873 (IQR 350–2064)

