Heart failure Prognosis over time: how the prognostic role of peak VO2 and ventilation efficiency during exercise has changed in the last 20 years : On behalf of the MECKI score research group

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Abstract

Aims

Exercise-derived parameters, specifically peak exercise oxygen uptake (peak VO2) and minute ventilation/carbon dioxide relationship slope (VE/VCO2 slope), have a pivotal prognostic value in heart failure (HF). It is unknown how the prognostic threshold of peak VO2 and VE/VCO2 slope has changed over the last 20 years in parallel with HF prognosis improvement.

Methods and results

Data from 6083 HF patients (81% male, age 61 ± 13 years), enrolled in the MECKI score database between 1993 and 2015, were retrospectively analysed. By enrolment year, four groups were generated: group 1 1993–2000 (n = 440), group 2 2001–2005 (n = 1288), group 3 2006–2010 (n = 2368), and group 4 2011–2015 (n = 1987). We compared the 10-year survival of groups and analysed how the overall risk (cardiovascular death, urgent heart transplantation, or left ventricular assist device implantation) changed over time according to peak VO2 and VE/VCO2 slope and to major clinical and therapeutic variables. At 10 years, a progressively higher survival from group 1 to group 3 was observed, with no further improvement afterwards. A 20% risk for peak VO2 15 mL/min/kg (95% confidence interval 16–13), 9 (11–8), 4 (4–2) and 5 (7–4) was observed in group 1, 2, 3, and 4, respectively, while the VE/VCO2 slope value for a 20% risk was 32 (37–29), 47 (51–43), 59 (64–55), and 57 (63–52), respectively.

Conclusions

Heart failure prognosis improved over time up to 2010 in a HF population followed by experienced centres. The peak VO2 and VE/VCO2 slope cut-offs identifying a definite risk progressively decreased and increased over time, respectively. The prognostic threshold of peak VO2 and VE/VCO2 slope must be updated whenever HF prognosis improves.