

Combined prognostic value of peak O₂ uptake and microvolt level T-wave alternans in patients with idiopathic dilated cardiomyopathy

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Abstract

Background: Despite the great improvement in clinical management of patients with idiopathic dilated cardiomyopathy (DCM), sudden cardiac death (SCD) and death due to worsening heart failure (HF) remain a challenging problem. The assessment of oxygen consumption (peakVO₂) has been recognized as an independent marker of mortality. Nevertheless peakVO₂ is not helpful in the risk stratification of SCD. Given this limitation, the association with another non-invasive test able to predict SCD such as microvolt level T-wave alternans (MTWA) would be useful.

Objectives: To determine the combined predictive value of peakVO₂ and MTWA in patients with DCM.

Methods: Seventy consecutive DCM patients were prospectively investigated. PeakVO₂ and MTWA were determined during bicycle exercise testing. Primary composite study end-point was defined as major cardiac events (MCE): total cardiac death or documented sustained VT/VF (including appropriate ICD shock). Secondary end-point was defined as arrhythmic events (AE): SCD or documented sustained VT/VF.

Results: Thirty-nine patients (55%) had a peakVO₂ < 10 ml/kg/min, while 40 patients (57%) showed an abnormal MTWA test. During an average follow-up of 19.2 ± 10.7 months, 11 MCE of which 6 AE have been documented. Among patients with abnormal MTWA and peakVO₂ < 10 ml/kg/min 8 MCE of which 5 AE occurred while among patients with normal MTWA and peakVO₂ ≥ 10 ml/kg/min no event occurred. From multivariate analysis, the combined prognostic value of MTWA and peakVO₂ achieved statistical significance for MCE ($p=0.03$, HR 0.28, 95% CI 0.12–0.95) and for AE ($p=0.05$, HR 0.39, 95% CI 0.18–0.99) while MTWA alone was a significant predictor of AE ($p=0.04$, HR 0.32, 95% CI 0.14–0.93).

Conclusions: Our results suggest that only the association of MTWA and peakVO₂, but not the two single tests, is a significant prognostic marker of both MCE and AE in DCM patients. However, MTWA alone confirms its predictive power as arrhythmic risk stratifier in this population.

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1. Introduction

Despite the great improvement in clinical management of patients with idiopathic dilated cardiomyopathy (DCM), sudden cardiac death (SCD) and death due to worsening heart failure (HF) remain a major health problem in these

patients. Recently, improved medical treatment [1] and cardiac resynchronization therapy (CRT), with or without a defibrillator back-up (ICD) [2,3], have significantly reduced mortality in these patients. Nevertheless, the identification of optimal candidate to CRT represents a challenging problem; furthermore only a small percentage of SCD-HeFT [4] population have received appropriate life-saving shocks from ICD with 2.5% absolute reduction in annual mortality [5]. Therefore, since the indiscriminate use of this devices

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