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

Massimo Baravelli a,b,c,⁎, Cecilia Fantoni a,d, Silvia Rogiani a, Stefania Farina a, Claudio Anzà c, Valeria Caltabiano b, Teresio Forzani b, Jorge A. Salerno-Uriarte a

a Department of Cardiovascular Sciences, Ospedale di Circolo and Fondazione Macchi, Università dell’Insubria, Varese, Italy
b Division of Cardiology, Clinical Institute Mater Domini, Castellanza, Varese, Italy
c Division of Cardiology and Cardiopulmonary Rehabilitation, Clinical Institutes Multimedica Santa Maria, Castellanza, Varese, and Multimedica Sesto S. Giovanni, Sesto S. Giovanni, Milano, Italy
d Division of Cardiovascular Interventional Radiology, Clinical Institute San Donato, San Donato Milanese, Milano, Italy

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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