

## ECG modifications, life-threatening ventricular arrhythmias and relation to mitral valve apparatus phenotype in mitral valve prolapse

D. Stevant, M. Plessis, J.B. Gourraud, C. Cueff, N. Piriou, A. Thollet, V. Probst, T. Le Tourneau

University Hospital of Nantes, Nantes, France

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**Background:** Mitral valve prolapse (MVP) is a common condition in the general population, which can be associated to non-specific ECG abnormalities described initially as ST segment depression, T waves flattening or inversion, especially in the inferior leads. Lately, this type of ECG abnormalities has been reported in patients with MVP and ventricular arrhythmias (VA) or sudden death (SD). However, the prevalence of ECG abnormalities has never been studied in a large series of patients, and the link between ECG abnormalities, VA and SD to echocardiography examination has never been prospectively assessed.

**Objective:** To study the prevalence of ECG abnormalities including ventricular arrhythmias in MVP patients and their link with echocardiographic characteristics.

**Methods:** All patients (n=731, MVP = 486, Controls = 245) were prospectively enrolled and underwent a comprehensive echocardiography and ECG. In MVP patients 81 had minimal systolic displacement (MSD), 92 isolated MVP, 108 mild-moderate MR, and 196 severe MR. A comprehensive qualitative and quantitative analysis of ECG obtained from rest ECG, 24-hours ECG recording or exercise stress tests, was carried out. Mean follow-up was 4.4 years.

**Results:** The mains ECG abnormalities were an inversion of T wave in the inferior leads found in 12 MVP vs 1 control (2.5 vs 0.4%, P=0.047) or a QRS notch (5.1 vs 2.9%, P=0.13). In bileaflet MVP T wave inversion was more frequent as compared with other MVP patients (3.8 vs 0.8%, P=0.039). In addition there was a progressive prolongation of PR interval, QRS duration and increase QT dispersion associated with worsening of MR and heart chambers remodeling. None of ECG findings were significantly linked with the presence of MVP only. Out of 731 individuals, 27 (3.7%) had an history of VA or SD. In a multivariate analysis, bileaflet prolapse and mitral annulus disjunction were associated with VA or SD, whereas none of ECG criterion was associated with.

**Conclusion:** In this large prospective series of MVP patients, prevalence of inferior leads ECG abnormalities is very low. Prolongation of atrio-ventricular and ventricular conduction, as well increased QT dispersion is associated with worsening of MR and LV remodeling. Bileaflet prolapse and mitral annulus disjunction are associated with VA or SD.