Nervous System

10.7 QT/RR Slope: a Novel Arrhythmogenic Substrate in Hypertensive Left Ventricular Hypertrophy

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Introduction. Left ventricular hypertrophy (LVH) portends an increased risk of ventricular arrhythmias and sudden death. QT rate dependence, i.e. the dependence of QT interval from the duration of the preceding cardiac cycle, is a major predictor of ventricular arrhythmias in hypertrophic cardiomyopathy, after myocardial infarction, and in patients receiving antiarrhythmic drug therapy, but data on the QT/RR relation in hypertensive LVH are lacking.

Methods. A total of 912 patients with untreated hypertension (57% men; age 49+/-11 years) underwent M-mode echocardiogram and standard 12-lead electrocardiogram. The QT interval was measured manually at the nearest 10 milliseconds in all leads from the onset of the QRS complex to the end of the T wave, and the longest QT interval was chosen. The average of 3 consecutive normal beats was considered for the analysis.

Results. In the whole cohort, a direct relationship was found between the duration of RR interval and QT duration (r=0.59, p<0.001). The slope of the QT/RR regression line was greater in patients with LVH (LV mass >=51 g/m2.7, n=324, b=0.163) than in those without (n=588, b=0.110). Such difference held in a multiple linear regression model (multiplicative interaction term "RR²—LVH": β=0.749, p<0.0001). The QT/RR regression slope increased progressively ongoing from the bottom to the top quartile of LV mass (see figure).

Conclusions. In essential hypertension, left ventricular hypertrophy is associated with an increased slope of the QT/RR regression line. This potential arrhythmogenic substrate may contribute to explain the hypertensive LVH-related risk for ventricular arrhythmias and sudden death.