The Application of Holter ECG-Based T-Wave Alternans in Arrhythmogenic Right Ventricular Dysplasia/Cardiomyopathy

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Background: Arrhythmogenic right ventricular dysplasia (ARVD) carries the risk of ventricular arrhythmias and sudden cardiac death (SCD). The modified moving average microvolt T-wave alternans (MMA TWA) has been explored to predict arrhythmic events and mortality in ischemic heart disease. However, the clinical application of TWA in ARVD remains unclear.

Methods: The cohort enrolled consecutive 33 patients with ARVD based on the new Task Force (TF) criteria. The Holter ECG-based MMA TWA was obtained and TWA ≥ 65 μV was defined as positive. Regarding the demographic, electrocardiographic, structural, and invasive electrophysiological characteristics, several factors were explored to predict mortality and malignant ventricular arrhythmias.

Results: During a mean follow-up duration of 18.09 ± 12.59 months (1-53 months), a total of 10 (30.3%) patients developed events, including 3 patients (30%) with SCD and 7 (70%) non-sustained or sustained ventricular arrhythmias. Ten patients underwent an implantable cardioverter defibrillator placement for secondary prevention. There were no differences in baseline characteristics and invasive electrophysiological results, except more patients with positive TWA in the event group. On multivariate analysis, independent predictors of events included positive TWA (P=0.011, OR: 11.677, CI: 1.77-77.09) and daily ventricular extrasystole percentage (P=0.047, OR: 1.101, CI: 1.001-1.21).

Conclusion: The MMA TWA could predict the risk of ventricular arrhythmia and mortality in patients with ARVD in addition to the TF criteria.

Keywords: arrhythmogenic right ventricular cardiomyopathy/dysplasia, T wave alternans, ventricular arrhythmias