

T-Wave Morphology Restitution in Chronic Heart Failure Patients with Atrial Fibrillation

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Background: Atrial fibrillation (AF) is associated with an increased risk of sudden cardiac death (SCD) but nowadays there is no non-invasive method that accurately predicts that risk. In 2017, a previous study demonstrated the SCD predictive value of the T-wave morphology restitution (TMR) index in chronic heart failure (CHF) patients with sinus rhythm enrolled in the “MUerte Súbita en Insuficiencia Cardiaca” (MUSIC) dataset. The aim of this study was to evaluate the SCD predictive value of TMR in CHF patients in AF rhythm.

Methods: 24-hour electrocardiogram (ECG) recordings from 171 AF subjects from the MUSIC study were analyzed. After the 4-year follow-up period, there were 19 SCD victims and 152 survivors of SCD. Since the original algorithm was applied in sinus rhythm ECG signals, we adapted it to cope with the specific features of AF rhythm. Among them, an RR-derived formula was adopted to robustly define T-wave end position. Lilliefors test was applied to evaluate the normality of data. Mann-Whitney U test and the T-test (under the unequal variances condition) were applied to assess for significant differences in TMR between the SCD and the non-SCD groups.

Results: TMR distribution in the SCD group was not normal. Mann-Whitney U test showed that the TMR differences between the SCD (median=0.0242, interquartile range= 0.0282) and the non-SCD (median=0.0272, interquartile range= 0.0176) groups were not significant ($p=0.617$). However, this might be due to the huge gap in sample among the populations. Assuming a balanced case-control scenario, the TMR value distribution would approach to a normal distribution. Then, T-test showed a significant difference in TMR between the two groups ($p=0.023$).

Conclusions: Future investigations will assess the SCD predictive value of TMR in CHF patients in AF by assuming a wider pool of subjects with 1:1 case-control ratio.