Measurements and changes in the ECG of patients suffering from Brugada syndrome: a longitudinal study

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Brugada syndrome (BrS) is an ion channel inherited channelopathy predisposing to ventricular arrhythmias and sudden cardiac death. It is characterized by the presence of electrocardiographic patterns, mostly involving changes in the ST segment and the T wave, whose presence can change over the years. These changes could be used for risk stratification an illness progression but its clinical value is yet to be fully investigated. In this work, we aim to assess the risk stratification performance of 11 ECG-derived biomarkers. For this purpose, we performed a 6-year-long longitudinal analysis of 10-second ambulatory 12-lead ECGs with Brs lead configuration, obtained placing the electrodes in the high precordial lead disposition, from 38 patients suffering BrS. Each ECG was preprocessed, including noise and artifact removal, and the start, peak, and end positions of each wave in every heartbeat were found. Then, 11 markers were computed to calculate random effect mixed models in each lead: ST deviation at J-point and J-point + 60 ms, ST slope, QT interval, corrected QT interval, average power of QRS, absolute value of QRS area, T wave symmetry, T duration, T peak and symmetry of the ST-T-wave complex. Results showed a considerable increase in the median value of the several markers such as T duration ($p < 0.01$), especially in the precordial leads, over the years. In conclusion, an observable trend of progression among specific markers is identified in this study. Further analysis over a larger population, also including a control group, is needed to confirm these findings and validate their diagnostic power.