

Fragmentation in Body Surface Potential Mapping Recordings from Patients with Brugada Syndrome

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Fragmentation of QRS complexes in Brugada syndrome (BrS) patients has been linked to a worse prognosis and higher risk. In this study we aim at determining the spatial location of fragmented ECG signals in BrS and controls in order to elucidate its potential role in the diagnosis of BrS and the identification of patients at higher risk.

We obtained 67-lead Body Surface Potential Mapping recordings of 38 BrS (6 symptomatic, 32 asymptomatic), 28 RBBB patients and 16 controls. Fragmentation of QRS complexes and P waves was automatically quantified by measuring the number of spikes constituting each wave and the percentage of notched waves, defined as waves with consecutive spikes with the same polarity.

Mean number of spikes within the QRS complex of RBBB patients and controls was 3.13 ± 0.64 and 2.99 ± 0.45 respectively, which was found to be significantly higher than the mean number of spikes for symptomatic (2.54 ± 0.49) and asymptomatic BrS patients (2.49 ± 0.44). RBBB patients and controls also presented a higher percentage of notched QRS complexes than BrS patients. However, notched QRS complexes of controls were mostly located posteriorly. Symptomatic BrS patients presented $34 \pm 23\%$ notched QRS in anterior leads vs. $21 \pm 17\%$ in asymptomatic BrS, $28 \pm 21\%$ in controls and $42 \pm 27\%$ in RBBB.

Mean number of spikes within the P wave of RBBB patients and controls was 2.06 ± 0.65 and 2.22 ± 0.66 respectively, which was found to be similar for asymptomatic BrS patients (2.15 ± 0.49) and lower than for symptomatic BrS (2.95 ± 1.08). Percentage of fragmented P waves in symptomatic BrS patients was also higher than that of asymptomatic BrS, RBBB and controls, with $63 \pm 22\%$, $44 \pm 18\%$, $38 \pm 23\%$ and $46 \pm 23\%$ respectively.

Fragmentation of QRS complexes appeared in the anterior torso of symptomatic BrS patients with a higher incidence than in asymptomatic individuals. P waves of symptomatic BrS patients were more fragmented than in other groups.