Autocorrelation and intercorrelation spectrum to predict of atrial fibrillation recurrence

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Abstract: Atrial fibrillation (AF) is the most common heart rhythm disorder in the world [1] and it is characterized by an uncoordinated atrial electrical activation, whose foci in most cases are found in the pulmonary veins [2].

Frequency domain analysis has been applied to atrial electrograms to quantify the temporal and spatial organization during AF in order to predict the outcome of the three months after a successful ablation intervention.

Intra-atrial recordings and pulmonary vein electrogram recordings were obtained before AF ablation procedure were analyzed by spectrum autocorrelation and intercorrelation of atrial activations from dipoles located along different atrial areas to to quantify temporal and spatial organization during AF.

Results showed changes in spectral characteristics with higher dispersion in spatial organization along the pulmonary veins in patients that had recurrence in the arrhythmia 0.14 ± 0.01 vs. 0.07 ± 0.02 compared with patients that maintained sinus rhythm ($p<0.001$).

The proposed analysis could be useful for a better understanding of electrophysiological mechanisms during AF in both groups of patients, where the electrical activity is collected from electrodes located in the pulmonary veins area before the isolation procedure.

Keywords: spectrum; correlation; atrial fibrillation; ablation

References

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