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Utility of pace-matching mapping in the ablation of idiopathic ventricular tachyarrhythmias

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Introduction: The electroanatomical mapping of idiopathic ventricular tachyarrhythmias (iVT) - premature ventricular contractions (PVC) and idiopathic ventricular tachycardia (VT) - is dependent on the recording of spontaneous PVC or induction of the clinical VT during the procedure to obtain the iVT activation map. The presence of infrequent and non-inducible iVT may preclude ablation. Pace-matching (PM) mapping of the anatomical region on interest, using the PaSo™ algorithm, may allow to circumvent this limitation.

Purpose: Determination of the utility of the PaSo™ pace-matching mapping for iVT ablation

Methods: A single-center retrospective study was made, with inclusion of consecutive patients undergoing iVT ablation between October 2013 and October 2016. It was collected electroanatomical data, including the highest correlation obtained by PM (PaSo™). Success of the procedure was assessed (defined as the elimination of spontaneous PVC during the electrophysiological study and non-inducible iVT at the end) and the ability of the PaSo™ pace-matching mapping to guide effective ablation was determined.

Results: 29 patients were studied (62.1% women, mean age 52.8±14.7 years). 65.5% presented symptomatic frequent PVC and 34.5% VT. The most frequent anatomic origin was the right ventricular outflow tract (58.6%), followed by the left coronary cusp (20.7%), mitro-aortic continuity (13.8%) and papillary muscles (6.9%). The ablation was successful (PVC elimination during the procedure) in 75.9% of the cases. In 79.3% of the cases it was possible to obtain an activation map; in 20.7% (6 cases) it was only possible to obtain a pace-matching map, because occurred suppression of PVC during the procedure, and success was achieved in 5 of these cases. There was no relationship between success and anatomical region of origin of the iVT. The mean value of the better pace-matching correlation was 94.45% ± 3.95%, being significantly higher when the zone of interest was located in the right ventricle (95.71±3.23 vs. 92.68±4.3, p=0.04). There was a positive and significant association between the PaSo™ correlation value and success (r=0.554; p=0.007). Significantly higher correlations were observed in successful ablations [95.9% vs 92%; p=0.006], and the PaSo™ correlation value was a good predictor of success (AUC: 0.874, 95% CI 0.74–1.0, p=0.003). The pace-matching threshold of 93.55% predicted ablation success with 86.4% sensitivity and 85.7% specificity.

Conclusion: In patients with iVT, pace-matching mapping provides a suitable method for performing ablation procedure, and it is essential in patients where spontaneous suppression of PVC occurs during the procedure. The achievement of a pace-matching correlation >93.55% conveniently identifies the dysrhythmic focus, allowing increasing of ablation success.