Substrate guided ablation of idiopathic right ventricular outflow tract premature ventricular contractions in patients with low arrhythmia burden during the procedure

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Background: Ablation of premature ventricular contractions (PVCs) is currently based on activation mapping. This strategy is impaired by the absence or paucity of PVCs on the day of the procedure. Frequently, isolated diastolic potentials (DP) are present at the successful ablation site in sinus rhythm (SR), although their meaning is still a matter of debate.

Objective: Evaluate the feasibility and results of a substrate-based approach for ablation of idiopathic right ventricular outflow tract (RVOT) PVCs, in patients that present with a low PVC burden during the procedure.

Methods: We included 12 consecutive patients referred for ablation of frequent (>10000/24 hours) idiopathic PVCs from the RVOT that present with less than 2 PVCs/min in the beginning of the procedure. The ablation was based on fast mapping of the RVOT in SR looking for DPs, defined as isolated small amplitude potentials occurring after the T wave of the surface ECG in SR (Figure). The area with DPs was marked and a reduced activation mapping of the PVCs was done in that area. We evaluated the procedure time, mapping, fluoroscopy and radiofrequency (RF) application times. The number of points used for the maps, the area of DPs, local activation time and success rate. Values are presented as median (Q1-Q3). Electroanatomical mapping of the RVOT in SR was also performed in a control group of 10 subjects that underwent ablation of supraventricular arrhythmias, to evaluate the prevalence of DPs in subjects without PVCs.

Results: The number of PVCs during the procedure was 1 (0.1–1.6)/min. Both groups did not differ in relation to age or gender. Median age 45 (34–65) years, 6 males in the PVC group and 40 (33–65) years, 6 males in the control group, p=0.821 and p=0.231 respectively. The number of points sampled per RVOT map in SR was 400 (193–500) in the PVC group and 330 (277–425) in the control group, p=0.539. All patients in the study group had DPs in the RVOT. None of the control group subjects had DPs in the RVOT. Ablation data is presented in the Table. The acute success rate was 100%. After a median follow-up time of 4 (3–6) months one patient had recurrence.

Conclusion: In these group of patients with very low PVC burden during the procedure, this approach partially based on substrate mapping, made ablation of the PVCs feasible, in a fast and efficient way.

Procedure time (min)	Mapping time (min)	Fluoroscopy time (min)	RF time (sec)	No. points PVC map	Area of DP (cm^2)	Local activation time (ms)
107 (78–120)	30 (22–48)	5.5 (4.2–12)	540 (390–699)	20 (12–24)	1.6 (1.1–6)	–38 (–34–45)

RF: radiofrequency; SR: sinus rhythm; DP: diastolic potentials.