

Assessment of wavefront propagation speed on the right ventricular outflow tract: deceleration zones associated with the presence of low voltage areas

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Background and aims: Activation wavefront is rapid and uniform in normal myocardium. Fibrosis is associated with deceleration zones (DZ) and late activated zones. The presence of low voltage areas (LVAs) in the right ventricular outflow tract (RVOT) of patients with premature ventricular contractions (PVCs) from this origin has been described previously. The aim of this study was to evaluate in sinus rhythm, the RVOT endocardial activation duration (EAD) and the presence of DZs, in patients with PVCs and in controls.

Methods: Consecutive patients with frequent (>10.000/24 h) idiopathic PVCs with inferior axis subjected to ablation that had an activation and voltage map of the RVOT performed in sinus rhythm. A control group of patients without PVCs that underwent ablation of supraventricular arrhythmias was also studied. Patients with structural heart disease, previous ablation or conduction disease were excluded. The RVOT EAD was measured as the time interval between the earliest and the latest activated region. Also evaluated the number of 10 ms isochrones throughout the RVOT and the maximal number of 10 ms isochrones within 1 cm, and a DZ was defined as a zone with > 3 isochrones within 1 cm. Low voltage areas (LVA) were defined as areas with local electrogram amplitude <1.5 mV.

Results: 42 patients, 29 in the PVC group and 13 control subjects. The site of origin of the PVCs was the RVOT in 23 patients and the LVOT in 6. The characteristics of the two groups are displayed in the Table. Patients with PVCs had longer RVOT EAD, total number of isochrones and presence of DZ was also significantly higher (See table). LVAs were more frequent in PVCs from the RVOT than from the LVOT (83% vs 33%, p = 0.033). Patients with LVA had longer EAD 60 (52-67) vs 36 (34-40) ms, p < 0.0001 (Figure A) and more DZ than patients without LVA 95% vs 0%, p < 0.0001 (Figure B and C).

Conclusions: The velocity of the wavefront propagation was slower and DZs were more frequently present in patients with PVCs and were associated with presence of LVAs.

	All sample N= 42	PVCs N = 29	Controls N = 13	p-value
Age in years, median (Q ₁ -Q ₃)	56 (35-65)	58 (38-66)	53 (28-67)	0.648
Male gender, n (%)	19 (45)	14 (48)	5 (39)	0.401
N° points in the map, median (Q ₁ -Q ₃)	410 (338-589)	467 (345-660)	345 (333-465)	0.056
Activation duration in ms, median (Q ₁ -Q ₃)	41.8 (36-61)	56 (41-66)	39 (35-41)	0.001
N° isochrones, median (Q ₁ -Q ₃)	4 (4-6)	5 (4-6)	4 (4-4)	0.037
Presence of DZs, n (%)	20 (48)	20 (69)	0 (0)	<0.0001
Presence of LVAs, n(%)	21 (50)	21 (72)	0 (0)	<0.0001

Abstract Figure.

