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Parallel Mapping and Catheter Ablation of Polymorphic Premature Ventricular Contractions: A New Feature for Activation Mapping

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ABSTRACT

Introduction: During conventional activation mapping of PVCs with a three-dimensional electroanatomical mapping system, only PVCs matching the active map's pattern are registered. Other morphologies have to be addressed sequentially, challenging effective treatment of polymorphic PVCs with low intraprocedural prevalence. A novel algorithm (CARTO III Software Version 7, Biosense Webster) facilitates simultaneous mapping of different morphologies, offering enhanced mapping opportunities for rare, polymorphic PVCs.

Case Presentation: An 80-year-old female presented to our outpatient clinic with recurrence of polymorphic PVCs, resulting in palpitations and dyspnea. Two prior ablation procedures had been initially successful, but recurrence of different PVC-morphologies was observed. Holter-ECG documented a high burden of polymorphic PVCs (52%) despite medication, indicating a third ablation procedure.

Clinical PVCs were scarce during the procedure, evident in the low number of PVCs (n=202) registered during a mapping time of 68:23 min (2.9 PVCs per minute).

Parallel activation mapping of different morphologies was performed using the novel mapping software. Considering their low intraprocedural burden, morphologies were mapped simultaneously to record more PVCs for each respective map.

Four morphologies were mapped, three of which were deemed clinically significant. Although morphologies 2 and 3 had a low burden of 0.57 and 0.58 PVCs per minute, the maps were sufficient to identify the PVC-origins at locations close to the aortomitral continuity (AMC).

RFC-ablation at the site of earliest activation led to acute suppression of all targeted morphologies. For mapping and ablation, a 3.5mm tip catheter was used (Navistar D-Curve, 7 F, Biosense Webster). 20 pulses were applied with an ablation time of 1375 seconds and maximum energy of 35 Watts (LV)or 20 Watts (distal great cardiac vein). Considering its very low burden (0.24 PVCs per minute) and remote origin, PVC 4 was not addressed.

After three months, the patient reported significant improvement of dyspnea and palpitations. 24 h Holter-ECG documented a reduction of PVC-burden to <1%.

Conclusion: Parallel mapping of polymorphic PVCs facilitates simultaneous activation mapping of different morphologies for patients with low intraprocedural PVC-burden, in which the construction of activation maps is challenging and time consuming with sequential mapping approaches.

Keywords: Activation mapping, PVC

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