Clinical and electrophysiologic characteristics of ventricular arrhythmia arising from pulmonary cusps

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Introduction: Ventricular arrhythmias (VA) have been successfully ablated from above the pulmonary cusps establishing pulmonary artery (PA) as a distinct site for the origin of VA apart from the right ventricular outflow tract (RVOT). The aim of the present study was to determine the clinical presentation, electrocardiographic and ablation characteristics of PA VAs.

Methods: Forty five consecutive patients with LBBB and inferior axis VA were included in this retrospective study. Three-dimensional electromagnetic mapping was performed in all patients. Initially mapping was performed in RVOT, and later in the PA. Mapping was performed in PA if there was no early activation and/or pace mapping was unsatisfactory or initial RF lesions in RVOT was unsuccessful. All PA VAs were mapped and ablated by looping the catheter in the reversed U fashion.

Result: The sites of successful ablation were RVOT in 22, PA in 8 patients and rest in left ventricular outflow tract (LVOT). The origin of PA VA according to cuspal positions are anterior in 4 (50%), left in 3 (37.5%), and right in 1 (12.5%). Age of onset of arrhythmia in PA VAs was significantly lower compared to RVOT VAs (39.25 ± 10.16 vs 51.82 ± 11.07 years, P<0.01). Both RVOT and PA VAs were common in females (75% vs 59.1%). The symptoms and VA burden were similar in both groups. Majority of the PA-VA group had VT as the presenting arrhythmia (62.5 %) whereas RVOT VAs more commonly presented as premature ventricular contractions (68.18 %). The comparison of ECG characteristics are described in table 1. Mapping by reversed U method of PAVAs revealed early activation time (28.75 ± 9.39 vs 12.00 ± 8.61 ms, P < 0.01) compared to RVOT VAs. Pre-potential was present in 4 (50%) and it preceded unipolar signals 35 ± 8.33 ms compared to 23 ± 8.3 ms to bipolar signals (P<0.01) (Image–I). Pace map score in PA VAs was higher than the pace map scores in RVOT (21.37 vs 14.25, P < 0.01).

Conclusion: PA VAs are important subset of VAs originating from the outflow tract. PA VAs have a wider baseline QRS duration. Mapping utilizing the reversed U method helps in localization and successful ablation of PA VAs.