Size does matter: Association between pulmonary vein size and arrhythmogenity during pulmonary vein isolation with PVAC®

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Background

-Previous clinical observations have highlighted the importance of focal pulmonary vein (PV) activity and local reentry activity within PVs in initiating atrial fibrillation (AF) (1).

-A recent study has shown that if patients have one arrhythmogenic vein, isolation of this vein alone might be sufficient (2).

-In addition, a computational analysis in a canine model has shown that wider and longer PVs contribute significantly to PV arrhythmogenesis (3).

-**Aim:** To check whether PV size is associated with arrhythmogenity of the vein during pulmonary vein isolation (PVI).

(1) Takahashi . JCE 2003;14:927-932

(2) Fichtner. JICE 2012;33:338 (ECAS 2012)

(3) Cherry . Heart Rhythm 2007;4:1553-1562

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Methods

- We studied prospectively 30 consecutive patients with AF who underwent PVI using the multi-electrode Pulmonary Vein Ablation Catheter® (PVAC®; Medtronic, Ablation Frontiers) between February and November 2012.

-Arrhythmogenic PVs were identified during ablation if they had either multiple ectopic beats, re-initiation of AF, or periods of paroxysmal short cycle length recording.

- Selective angiograms of all PVs were performed before introducing the PVAC® and were used for measuring PV diameter later on by a blinded investigator.

-Proportion (95% CI) of concordance and Kappa measure of agreement between the largest PV and arrhythmogenity were calculated. Fisher's exact test was used in case of 2*2 tables.

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Results

-A total of 30 patients (60% men, 60.6±11 years, 93% paroxysmal AF, 10% redo PVI) were studied.

-Arrhythmogenity was found in 79.3% of the largest PV (95%CI 61.9-91.2, Kappa=0.787).

-**Analysis of each vein separately has shown significant association in all veins except in RIPV:**

-the ratio of number of arrhythmogenic veins out of the number of largest veins was significantly larger than the ratio of arrhythmogenic veins out of the non-largest veins (LSPV: 100% vs 25%, p<0.001; LIPV: 83% vs 22%, p=0.011; RSPV: 83% vs 26%, p=0.018; RIPV: 33% vs 23%, p=1; Left common PV: 100% vs 8%, p<0.001; Right common PV: 100% vs 7%, p=0.015).

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Conclusions

-Our preliminary results show that larger PV diameter is highly associated with PV arrhythmogenity during PVI with PVAC®.

-Future studies are needed to clarify whether ablating the largest vein alone is sufficient.

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