Clinical applications

## P435

# Reproducibility and predictive value of a simple novel method to measure pulmonary vein activity in persistent atrial fibrillation FARS AF CL study

Spera F.[1]; Rodriguez-Manero M.[2]; Baluja A.[2]; Mortelmans P.[1]; Saenen J.[1]; Miljoen H.[1]; Huybrechts W.[1]; Bories W.[1]; Vandaele L.[1]; Ennekens G.[1]; Heidbuchel H.[1]; Sarkozy A.[1]

[1]University Hospital of Antwerp, Antwerpen, Belgium
[2]University Hospital of Santiago de Compostela, Cardiology, Santiago de Compostela, Spain

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**Introduction.** Pulmonary vein (PV) firing can trigger or act as a rapid driver to maintain atrial fibrillation (AF). Automated 1-minute measurement of fragmented and non-fragmented PV activity cycle length (CL) showed contradictory results to predict ablation outcome in persistent AF.

**Purpose.** This study investigated the reproducibility of a novel non-automated simple method to measure non-fragmented fastest discrete consecutive AF signal cycle length and the value of this measurement in the PVs to predict long-term success after pulmonary vein isolation (PVI) only ablation in persistent AF.

**Methods.** Consecutive 75 patients with persistent AF undergoing first-time PVI between 2015 and 2018 were included. The mean of 10 FAstest Repetitive Similar morphology discrete signal cycle lengths (FARS-AF CL) were measured twice with > 2 minutes between in the coronary sinus (CS), superior vena cava (SVC), left and right atrial appendage (LAA, RAA) and PVs. FARS discrete AF signals were defined as (I) signal duration ≤80 msec; (II) repetitive similar morphological characteristics; (III) fastest consecutive 10 intervals during 1-minute observation. The reproducibility of the FARS–AF CL measurement was compared to traditional 10 consecutive interval measurements of fragmented CS signals. The CL gradient between the PV and the LA was quantified by the computing the ratio of the PV and LAA or CS CL.

**Results.** Good correlation was found between two FARS CL measurements in the CS, PVs, LAA and RAA (Correlation Kendall area: 0.882, 0.675-0.941, 0.859, 0.944, respectively). The correlation between two traditional CL measurements of fragmented CS signals was low (Correlation Kendall area:-0.006). After a mean follow-up of 20 months, freedom from atrial arrhythmias was achieved in 50 (66%) patients after the single PVI procedure with or without the use of AADs. Patient without recurrence were more likely to have FARS CL ≤140 msec (8 vs. 42%, p= 0.002), higher FARS PV CL/LAA CL and FARS PV CL/CS CL ratio (96 ± 13% vs. 86 ± 23 %, p= 0.04; 95 ± 13% vs. 82 ± 22%, p= 0.036). Patients with recurrence at follow-up had more dilated left atria (LAVI: 44 ± 12 vs. 38 ± 9 ml/m2, p= 0.02; LA diameter: 49 ± 6 vs. 45 ± 6 mm, p= 0.01), less AF termination during the procedure (16 vs. 37%, p= 0.049) and less first pass isolation (44 vs. 68%, p= 0.04). Multivariable Cox regression analysis showed that LAVI (p = 0.035) and FARS-PV CL (0.011) were significant predictors of arrhythmia free survival. After adjusting for LAVI, FARS-PV CL remained a significant predictor of AF recurrence (p = 0.028).

**Conclusions.** Traditional non-automated AF CL measurement of fragmented CS signals is poorly reproducible. FARS-AF CL measurements in the PVs, RA and LA structures are highly reproducible. FARS-AF CL measurement in the PVs could predict the success of PVI-only procedure in persistent AF independent of left atrial size.