PVAI. Left atrial posterior wall could be the trigger for AF. Isolation of this region is feasible and effective.

INTERVENTIONAL ELECTROPHYSIOLOGY FOR VENTRICULAR ARRHYTHMIAS

Left ventricular 4D rotational angiography in biplane EP setting.

— J.-Y. Wielandts[1,2], S. De Buck[2,4], K. Michielsen[2,3], R. Louw[1], C. Garweg[1], J. Nuyts[2,3], J. Ector[1], F. Maes[2,4,5], H. Heidbüchel[1] *([1]Department of Cardiovascular Sciences, [2]Medical Imaging Research Centre, KU Leuven & UZ Leuven, [3]Department of Nuclear Medicine and Molecular Imaging, [4]Department of Electrical Engineering, ESAT/PSI, Medical Image Computing, [5]iMinds-Future Health Department, KU Leuven, Leuven, B)*

Objectives. Static 3D anatomy-guided interventional LV procedures are limited in accuracy due to prominent LV motion. The online availability of images from multiple cardiac phases could minimise mismatch with per-procedural catheter localisation. We aimed to evaluate the accuracy of our recently developed acquisition and post-processing protocol for low radiation dose LV Dynamic 3D Rotational Angiography (4DRA) in conventional biplane fluoroscopy EP setting.

Methods. Five-phase 4DRA image acquisition was performed in patients undergoing left sided ablation (n = 6, all male; BMI = 24.9 ± 2.9 kg/m^2), by injecting iodine contrast (94.0 ± 4.5 ml; 36.2 ± 2.6 gI) through a transseptal pigtail catheter in the LA and pacing the RA at 85bpm during apnoea, using optimal radiation field collimation (to 72.8 ± 6.6% of detector height). The noisy reconstructed images were post-processed using our inter-phase registration-based filtering and metal artefact correction methods to increase contrast-to-noise-ratio (CNR) and enable semi-automatic LV cavity segmentation, yielding 5 LV models per cardiac cycle. Biplane (RAO & LAO) angiography was performed at 15fps in identical circumstances and the LV was manually delineated in the 5 corresponding cardiac phases (retrospective ECG-based selection). The 4DRA models were registered to the biplane angiography images using our current clinical software tool LARCA. Their contours were then compared to the angiography delineations.

Results. 4DRA effective radiation dose, as calculated by Monte Carlo simulation and using ICRP103 definition, was 4.7 ± 0.9mSv. Post-processing significantly increased CNR by a factor of 7.0 (95%CI 6.5-7.5, $P < 0.0001$). Semi-automatic segmentation was possible in all. Comparing 4DRA LV model contours from 5 phases to their respective angiography delineations yielded an absolute error of 1.4 ± 1.4 mm in RAO and 1.0 ± 1.2 mm in LAO, while errors were < 4 mm in 94.9 ± 2.5% resp. 97.5 ± 2.0% of the contours. No significant difference in error between the different cardiac phases could be found ($P = 0.80$ resp. 0.78).

Conclusions. Post-reconstruction inter-phase registration-based filtering and metal artefact correction enable generation of low-dose 4DRA LV models. Validation in clinical EP setting showed very high accuracy of the generated LV models with respect to LV angiography in conventional RAO and LAO views for 5 phases throughout the full cardiac cycle. Accurate 3D and 4D modelling of the LV is now possible at physiologic heart rates. This opens perspectives for 3DRA in awake patients, and full cardiac cycle dynamic anatomical guidance during interventional procedures.

An intramural focus of a septal ventricular tachycardia: insights from MRI.

— B. Berte, F. Sacher, H. Cochet, S. Mahida, S. Yamashita, H. Lim, A. Denis, N. Derval, M. Hocini, M. Haïssaguerre, P. Jaïs *(CHU Bordeaux Hôpital, Haut-Lévêque, FR)*

Objective. Septal and intramural location of scar/VT is known to be difficult to ablate. We present a case in which we encountered failure of multiple unipolar ablations, a steam pop and finally successful bipolar ablation, with consecutive high resolution DE-MRI images.

Results. A 38-year-old-female with recurrent episodes of sustained septal VT with structurally normal heart was referred after 5 failed VT ablations. DE-MRI demonstrated the ablation sites (figure A). VT was not inducible. Substrate based mapping showed septal abnormal Purkinje activity and a normal epicardial voltage map. High output RF delivery with conventional irrigated catheter resulted in a 'steam pop'. A post-procedure MRI showed a septal intramural hematoma and no evidence of a transmural scar (figure B). She experienced a recurrence 3 month (?) after and a new ablation was performed. Pre-procedure MRI demonstrated resolution of the septal haematoma (figure C). VT was again not inducible during EP study. We identified LAVA in the mid ventricular septum. In an attempt to create a transmural septal lesion, we performed bipolar ablation. Ablation catheters were positioned on either side of septum and connected to a dual catheter ablation box (Stockert). Up to 60 watts of energy was delivered between the distal tips. During the ablation, LAVA signals disappeared for the first time in this patient and no recurrence was noted at 6 (?) month. A post-procedure MRI demonstrated a new intramural septal lesion (figure D).

Conclusion. This is to our knowledge the first case were high resolution MRI images (1.251.25 × 2.5 mm) of the results of repeated ablations, a steam pop and the results of a bipolar septal ablation were performed.