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Feasibility, safety and efficacy of tailoring ablation index to left atrial wall thickness (lawt) during atrial fibrillation ablation. The Ablate By-LAW Study

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Introduction: Circumferential pulmonary vein isolation (PVI) has become a mainstay in the treatment of atrial fibrillation (AF). The utility of ablation index (AI) to dose radiofrequency delivery for the reduction of AF recurrences has already been proven with a target AI ≥ 400 at the posterior wall and ≥ 550 at the anterior wall. Nevertheless, the left atrial wall is a thin, heterogeneous structure with an important inter and intra-patient variability of LAWt.

Objective: To determine if adapting AI to atrial wall thickness (AWT) is feasible, effective and safe during AF ablation.

Methods: Single-Center study that included 80 consecutive patients referred for a first paroxysmal AF ablation that was performed with a single catheter approach with the intention to reduce vascular access complication rate. All patients had a MDCT prior to the ablation procedure. LAWt maps were semi-automatically computed from the MDCT as the local distance between the LA endo and epicardium. All procedures were performed under general anesthesia with a high-rate low-volume ventilation protocol for obtaining higher catheter stability. The transeptal puncture was TEE-guided. During the procedure, the WT map was fused with the LA anatomy using CARTO-merge. LAWt was categorized into 1mm-layers and the AI was titrated to the local atrial WT as follows: Thickness < 1 mm (red): 300; 1-2 mm (yellow): 350; 2-3 mm (green): 400; 3-4 mm (blue): 450; > 4 mm (purple): 450 (Figure). Maximal inter-lesion distance was set at 6 mm. VisiTag settings were: catheter position stability: minimum time 3 s, maximum range 4 mm; force over time: 25%, minimum force 3 g; lesion tag size: 3 mm. Respiration training was not possible due to the high catheter stability. The circumferential ablation line was designed in a personalized fashion to avoid thicker regions.

Results: 80 patients [41 (51,2 %) male, age 60 ± 11 years] were included. Mean LVEF was 59 ± 5 %, Mean LA diameter $39,1 \pm 5,8$ mm, Mean LAWt was 1.36 ± 0.63 mm. Mean AI was 352 ± 36 on the RPVs and 356 ± 36 on the LPVs. Procedure time was 60,0 min (IQR 51-70). Fluoroscopy time was 58,5 s (35-97,5). First pass isolation was obtained in 72 (90%) of the RPVs and 75 (93,8%) of the LPVs.

Conclusions: the present study, assessing a novel, personalized protocol for radiofrequency titration during atrial fibrillation ablation, shows a high rate of first pass isolation with a lower need for RF energy delivery and lower procedure requirements, as compared to previous PV ablation protocols. Further studies are needed to evaluate the long-term results of this approach.

Abstract Figure. LAWt-map VisiTag points with tailored AI

