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Comparison of Focal Impulse and Rotor Modulation Ablation (FIRM) only versus second-generation cyroballoon ablation in patients with paroxysmal atrial fibrillation

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Background: Rotors have been postulated to be a major driver of atrial fibrillation (AF). Initial studies demonstrated, that focal impulse and rotor modulation (FIRM) might be an effective therapy for the treatment of paroxysmal AF (PAF). However, data about FIRM-guided ablation strategies without PVI is sparse.

Objective: To compare the safety and efficacy of FIRM-guided catheter ablation (without PVI; FIRM arm) and second generation cryoballoon (CB2, CB2 arm) based PVI in patients with paroxysmal atrial fibrillation (PAF) and de-novo catheter ablation of AF.

Methods: In this retrospective single-center study patients with PAF undergoing de-novo ablation of PAF between February 2016 and January 2017 were enrolled. Patients treated with FIRM-guided AF ablation as a standalone therapy without PVI were included and compared with patients undergoing CB2 based PVI. All patients in the FIRM arm were part of the randomized multicenter FIRMAP AF trial (results of this trial will be presented at this meeting). In patients undergoing FIRM-guided ablation, 3D electroanatomical mapping of both atria was performed. Rotor mapping using FIRM technology was conducted in spontaneous or induced AF. The procedural endpoint was the elimination of all rotors and focal impulses; no PVI was performed in those patients. In the CB2 arm, CB based PVI with the procedural endpoint of isolation of all veins was performed. Procedural data and arrhythmia-free survival after 12 months were compared.

Results: FIRM-guided and CB2 based AF ablation was performed in 22 and 86 patients, respectively. Follow up was completed in 20 and 79 patients LA diameter differed between groups. Otherwise, baseline characteristics did not differ between the FIRM group (mean age 60±11 years, 59.1% males) and the CB2 group (mean age 62±13, 62.4% male).

Arrhythmia-free survival including a 90-day blanking period was 25.0% (15/20) in the FIRM group and 86.1% (11/79) in the CB2 PVI group (p=0.000; Figure 1). Procedure duration was significantly longer in the FIRM group (152 [120; 176] minutes) compared to the CB2 PVI group (122 [110; 145] minutes) (p=0.031), whereas radiation dose was lower in the FIRM group (1266 [1027; 2281] cGy·cm^2 vs. 3020 [1677; 4215] cGy·cm^2). Adverse events (groin complications) occurred in 1 patient (1.2%) in the CB2 PVI group and 5 patients (22.7%) in the FIRM group.

Conclusion: De novo ablation of PAF using a FIRM-guided AF ablation only (without PVI) is associated with poor arrhythmia-free survival after 12 months compared to CB2 PVI. These results underline the importance of PVI as the first-line approach in catheter ablation of AF.

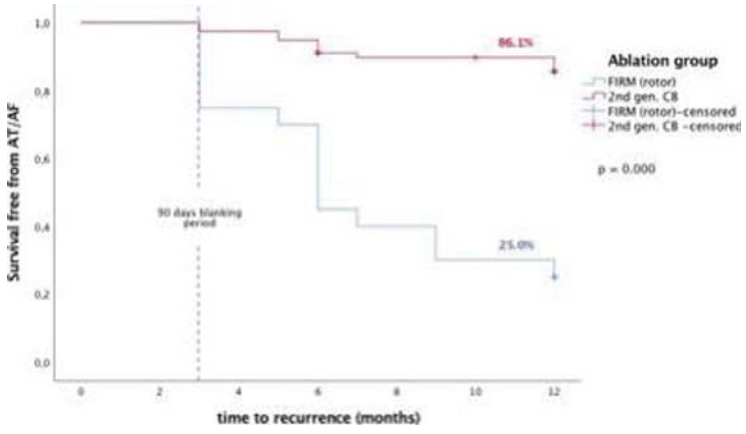

Figure 1. Kaplan-Meier-survival curve dem