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Persistent atrial fibrillation terminated within the left atrium without recurrence at follow-up demonstrates a gradual intracardiac organization during stepwise ablation

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Introduction: We previously reported that patients (pts) with recurrence (Rec) after stepwise catheter ablation (step-CA) of persistent atrial fibrillation (pAF) exhibit high bi-atrial intracardiac dominant frequencies (DF) values before ablation, indicative of a severe bi-atrial electro-anatomical remodeling.

Purpose: Herein, we hypothesized that a gradual decrease in DF values during step-CA is associated with pAF termination and maintenance of sinus rhythm (SR) on the long term.

Method: In 40 consecutive pts (61±8 yo, sustained AF duration 19±11 months), pulmonary vein isolation (PVI) and left atrium (LA) ablation were performed until pAF termination or cardioversion. 10-sec intracardiac electrograms (EGMs) epochs were recorded before ablation (BL), during PVI and during complex fractionated atrial electrograms (CFAEs) and linear ablation (post_PVI) in the right atrial (RAA) and left atrial (LAA) appendages and in the coronary sinus (CS). DF was defined as the highest peak within the [3–15] Hz EGM spectrum. Rec was defined as any atrial arrhythmia lasting >30 sec during follow-up (FU).

Results: pAF was terminated within the LA in 70% (28/40, LT) of the pts, while 30% (12/40, NLT) were not. After a mean FU of 34±14 months, all NLT pts had a Rec, while LT pts presented a Rec in 71% (20/28, LT_rec) and remained in SR in 29% (8/28, LT_norec). Figure 1 shows: 1) a gradient in DF values measured in the LAA (panel A), RAA (panel B) and CS (panel C) with the highest values in NLT pts (red), intermediate values in LT_rec pts (yellow) and lowest DF values in LT_norec pts (green); 2) all three groups displayed a gradual intracardiac organization during LA ablation as shown by decreasing DF values ($p<0.05$, BL vs post_PVI), but the LT_norec pts (green) exhibited the highest relative changes in DF from BL ($p<0.05$, LT_norec vs NLT, Δ range: –5.31 to –9.69%).

Conclusion: Low DF values before ablation and gradual intracardiac organization until pAF termination are associated with maintenance of SR on the long term.

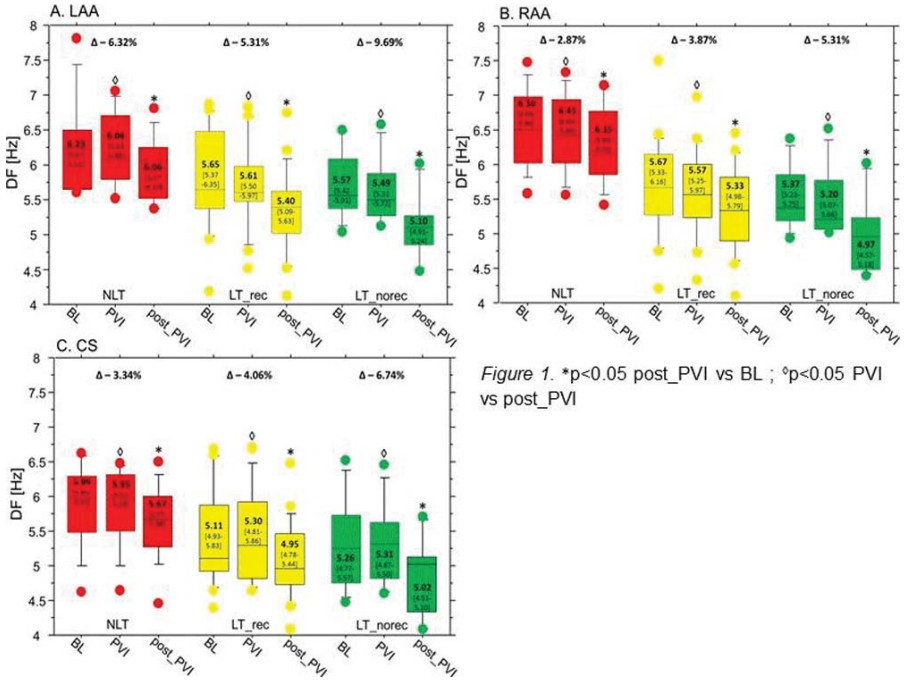

Figure 1. *p<0.05 post_PVI vs BL ; ◊p<0.05 PVI vs post_PVI

Figure 1. Effect of ablation on DF