Evaluation of atrial complexity of patients undergoing atrial fibrillation ablation: a clinical computational study

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**Background:** Pulmonary veins (PV) electrical isolation is the cornerstone of atrial fibrillation (AF) treatment, but other proarrhythmic areas of the atria may trigger or sustain AF.

**Objective:** We used computer simulations to analyze AF complexity measured using non-invasive electrocardiographic imaging (ECGi).

**Methods:** We included 30 patients that underwent PVI. Personalized simulations using biatrial anatomies segmented from MRI images and an automata model for modeling the electrical activity were compared with ECGi results to evaluate the long-term outcome of AF ablation.

**Results:** Simulation maps closely correlated with the rotors histogram obtained from patients’ ECGi: high entropy areas from simulations matched the areas with higher density of rotor presence on the ECGi. Simulations revealed that successful ablations occurred in patients with rotors mainly located at the PV area, while unsuccessful ablations presented an increased number of high entropy foci, greater distribution of rotors along the atria and lower number of PV rotors. The number of rotors attached to the PV was significantly higher in patients with favorable long-term ablation outcome (1-year AF Freedom: 1.61 ± 0.21 vs. AF: 1.40 ± 0.20; p-value = 0.018).

**Conclusion:** This simulation approach could improve patient screening and ablation design prior to the intervention providing information of the complexity of the atria.

Abstract Figure. Rotor maps, ACM and ACB for 3 patients

![Abstract Figure](https://academic.oup.com/europace/article/23/Supplement_3/euab116.236/6283125)