

Validation of a Novel Imageless ECGI System for the Characterization of Atrial Tachycardias

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Introduction. Electrocardiographic Imaging (ECGI) has attracted clinical interest for the diagnosis of regular atrial tachycardias (AT). Current ECGI systems require cardiac geometry obtained from computed tomography (CT) scans and its clinical adoption is difficult. We validated a novel imageless ECGI system, that does not require CT scans, for the characterization of AT.

Methods. The novel ECGI estimates the most plausible bi-atrial geometry and localizes it inside the patient torso reconstruction by means of an iterative process based on patient anatomical data. The system was evaluated in computational models (Figure 1, Panel A) and validated in sixteen patients with an indication of AT ablation. Clinical results were compared against endocavitary electroanatomical mapping (EAM), Figure 1, Panel B.

Results. AT characterization

for the estimated bi-atrial geometries was precisely identified for all simulated data. A total of 18 AT were mapped with ECGI and EAM. The non-invasive system correctly identified 100% of the AT as originating from the right or the left atrium. ECGI identified the AT mechanism and the target site for arrhythmia termination with a precision of 94,4% and 83,3% respectively.

Conclusions. This study validates a novel ECGI system that accurately characterizes AT before endocavitary procedures without the need for CT scans.

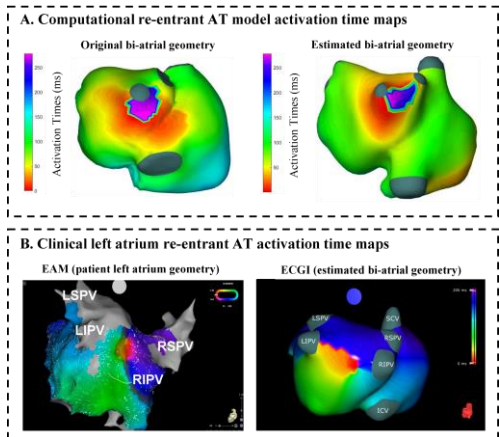


Figure 1. Activation times maps for re-entrant AT. Panel A: computational model evaluation. Panel B: clinical data validation.