Electrocardiographic Imaging of Atrial Fibrillation Detects Sites of Acute Termination after Rotor Ablation

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Ablation of atrial fibrillation (AF) has been proven an effective therapy for drug refractory AF patients. Intracardiac mapping and non-invasive electrocardiographic imaging (ECGI) may identify AF drivers with different properties, yet they have not been compared in the same patients. In this abstract we present 4 cases highlighting the potential complementation between re-entrant driver location from simultaneous prospective endocardial and non-invasive recordings.

Intracardiac electrograms of 4 patients in which localized ablation terminated AF (3 persistent, 68±11 years, 3 male) were recorded simultaneously with a 64-pole basket catheter and 52-lead body surface recordings. Rotational sources detected by activation+phase (FIRM) analysis was used to prospectively guide the ablation procedure. ECGI signals were reconstructed by using zero-order Tikhonov regularization and reentrant sources were identified by phase analysis.

Endocardial analysis revealed 8±3 reentrant sources with baskets covering 71±11% of the atrial endocardial wall (< 1 cm from an electrode). Localized ablation was conducted in 5±2 sources and in all 4 patients the ablation of one of such sources terminated AF to either sinus rhythm (3 cases) or atrial tachycardia (1 case). ECGI analysis identified all these termination sources (100%) with a spatial error of 13±4 mm. Of the total amount of reentrant sources, 6±2 (73±10%) were identified with ECGI with a spatial error of 19±9 mm.

AF rotational sources can be detected both endocardial and non-invasively, at least with moderate spatial concordance. Non-invasive mapping can complement basket recordings helping to identify AF sources in anatomies hard to be mapped.