

## A new approach to atrial flutter ablation using functional substrate mapping with wave-front discontinuity during sinus rhythm

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**Background:** Ultra high-density (UHD) mapping allows accurate identification of local abnormal electrograms and low voltage within a small area range, allowing precise identification of reentry circuits. Areas with high isochronal density in a small area known as deceleration zones (DZ) are responsible for reentry.

**Purpose:** Identify the DZ and areas of low voltage in sinus rhythm (SR) and evaluate the feasibility of performing atrial flutter (AFL) ablation by targeting those zones.

**Methods:** We prospectively enrolled patients in SR referred for AFL ablation (either typical or atypical). An isochronal late activation mapping (ILAM) during SR with UHD catheter was performed, annotating latest deflection of local electrograms. DZ were defined as areas with >3 isochrones within 1cm radius, prioritizing zones with maximal density. Atrial flutter was then induced and ILAM during flutter was performed for comparison. Voltage mapping was also assessed (0.1-0.5mV). Ablation targeted DZ in SR that displayed the higher voltage. DZ in SR were compared to DZ in AFL. Number of radiofrequency (RF) applications needed to terminate AFL were assessed. After AFL termination, complete line of the slow conduction zone was completed, and pulmonary vein isolation (PVI) was done in case of left AFL. Categorical variables are presented in absolute and relative values and median and interquartile range were used for numerical variables, as well t-student test for correlation of numerical variables.

**Results:** We studied 6 AFL (4 atypical, 66.7%) in 5 patients, 2 male (40%), median age 70 (64- 72). UHD ILAM in SR with 2195 points (1212-2865) and 2197 points (1356-3102) in AFL ( $p = 0.62$ ). The UHD ILAM identified a median of (QR) DZ in SR, that colocalized with AFL isthmus and DZ in AFL in 100%. DZ were not always located in low voltage areas. Aiming at the higher voltage in the DZ terminated the AFL in all cases, with a median RF time of 38 (25-58) seconds and AFL was no longer inducible. However, according to protocol, the complete line of slow conduction zone was done, with a median RF time of 1049.5 (274-1194) seconds ( $p = 0,009$ ).

**Conclusions:** Isochronal mapping in sinus rhythm with UHD catheters can display the functional substrate for reentry in AFL, allowing a substrate guided ablation in case of non-inducible AFL. Targeting the areas of high isochronal density, is effective in terminating AFL, obviating the need for extensive ablation.

Abstract Figure.

