Characterization of Density of High Dominant Frequency Sites in Persistent Atrial Fibrillation Patients

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INTRODUCTION

- Dominant Frequency (DF) analysis of atrial electrograms (AEGs) has been used to characterise atrial fibrillation (AF). Sites of high DF (HDF) might help identifying drivers of persistent AF (persAF). Previous studies have shown that DF of AEGs lacked in spatiotemporal stability, hence targeting sites of HDF from a single time frame is unlikely to be a reliable ablation strategy.

- Characterization of HDF spatiotemporal distribution and stability are critical to their relevance as targets for catheter ablation. This study focused on accumulating HDF maps over time to produce HDF density maps, which allowed us to statistically distinguish the dense regions that could be targets for ablation.

METHODOLOGY

- Ten patients undergoing catheter ablation for persAF were studied. 2048 noncontact virtual unipolar AEGs were simultaneously recorded using a balloon array (Ensite Velocity, St. Jude Medical, resampled at 512 Hz).

- After QRST subtraction, fast Fourier transform was used to detect the DF on each AEG (range 4 Hz - 10 Hz; 4 s time window; 50 % overlap; HDF, DF - 0.25 Hz; up to 75 seconds/patient). HDF, organization index (OI) and regularity index (RI) were calculated at each site. The number of times HDF occurred at each node of the left atrium (LA) was counted in order to find the HDF density for each patient (Figure 1).

- The 2048 nodes in the LA were divided into two groups according to the HDF density (Group A > 80 % and Group B ≤ 80 %).

RESULTS AND DISCUSSION

- The HDF regions, together with their neighbouring sites, (DF values within 0.25 Hz of the highest DF), produced an area consisting of a collection of points that reflect average order to find the HDF density for each regional activity.

CONCLUSION

- AEGs with HDF are believed to represent atrial substrates with periodic activation responsible for the maintenance of persAF. HDFs do revisit the same atrial regions and sites where HDF are frequently seen in persAF could indicate drivers of AF and are potential targets for ablation therapy in persAF.