

Association of coronary sinus activation time differences with atrial remodelling in atrial fibrillation

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[AIM] Atrial fibrillation (AF) is a progressive cardiac arrhythmia associated with structural atrial remodelling, which reduces therapeutic success rates. The coronary sinus (CS) mapping catheter is routinely used during catheter ablation of AF, but its data remain underutilised. This study investigated whether local activation time (LAT) differences along the CS catheter electrograms are associated with AF progression, characterised by AF type (paroxysmal vs persistent) and left atrial volume index (LAVI). We hypothesised that more advanced AF is associated with increased LAT differences.

[METHODS] This retrospective analysis used data from the ISOLATION study. Patients undergoing first-time ablation presenting in sinus rhythm at the start of the procedure were included ($n=385$). This analysis represents an interim subset ($n=39$). AF type was classified as paroxysmal or persistent according to clinical records. LAVI was obtained from pre-procedural echocardiography. Ten-minute ECG and CS recordings ($fs=1$ kHz) prior to ablation were exported for offline analysis. R-peaks were detected using the Pan–Tompkins algorithm. CS LAT was determined within a predefined atrial window (-300 to -50 ms before the R-peak) as the temporal midpoint between the largest positive and negative deflections of the bipolar electrogram. Absolute LAT differences were calculated between neighbouring electrode pairs, and the median LAT difference per patient was used for analysis. AF type differences were assessed using the Mann–Whitney U test, and correlation with LAVI using Pearson's r .

[RESULTS] Median LAT difference did not differ significantly between AF types (paroxysmal: 9 ms [IQR 1], persistent: 10 ms [IQR 1.8], $p = 0.19$). A weak-to-moderate positive correlation with LAVI was observed, which did not reach statistical significance ($r = 0.25$, $p = 0.13$).

[CONCLUSION] Preliminary results suggest a modest association between prolonged LAT differences and more advanced AF. Analysis of the remaining patients is ongoing to further evaluate this association.

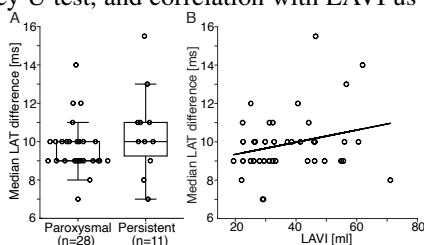


Figure 1. A) AF type B) LAVI