ABSTRACT: 664

LOCAL CATHETER IMPEDANCE DROP DURING PULMONARY VEIN ISOLATION PREDICTS CONDUCTION BLOCK IN PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION: INITIAL RESULTS OF THE LOCALIZE CLINICAL TRIAL

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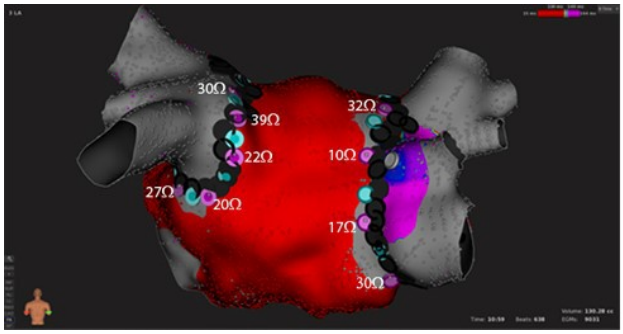
Background: Radiofrequency (RF) catheter ablation for pulmonary vein isolation (PVI) requires resistively heating cardiac tissue to create conduction block. Creation of an RF lesion results in an impedance drop and the magnitude of this drop depends on the temperature and amount of myocardium being heated. Pre-clinical and clinical evaluation of an advanced local impedance (LI) metric found that greater LI drops were indicative of more effective lesion formation.

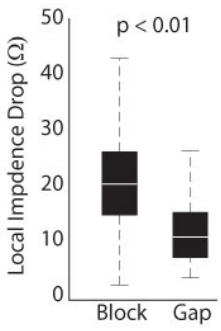
Purpose: To evaluate whether LI drop is associated with conduction block after first pass encirclement of the PVs in patients with paroxysmal AF.

Methods: LOCALIZE is an ongoing, single-arm, multi-center clinical trial (clinicaltrials.gov NCT03232645). LOCALIZE consists of an index PVI procedure (results presented here) and a 3-month follow-up mapping procedure. In the index procedure, electroanatomical maps of the left atrium were created and ipsilateral PVs were divided into 8 anatomical segments (n=16 per patient). PVI was performed using point-by-point ablation with blinding of operators to LI. Following initial encirclement and a 20-minute wait period, coronary sinus- paced electroanatomical maps were created to identify gaps within anatomical segments. Gaps were annotated on the map and subsequently ablated. Mean LI drop within each segment was calculated offline as an estimate of regional RF energy delivery (Figure - Left). The diagnostic accuracy of LI drop for predicting segment block was assessed using receiver operating characteristic (ROC) analysis in segments with inter-lesion spacing =6mm.

Results: Forty-seven patients with paroxysmal AF underwent PVI at 5 centers (age 62±11 years, male 55.3%). All patients left the index procedure with all PVs isolated. When blinded to LI (n=3,064 ablations), median baseline LI was 106 (IQR: 97-115) ? and median LI drop was 18.4 (12.7-24.9) ?. After first pass encirclement, blocked segments had a significantly larger LI drop (20.2 [14.6-26.0] ?) than segments with gaps (10.6 [6.9-15.1] ?, p<0.01, Figure - Right). The association between LI drop and block was further evaluated along anatomical anterior/posterior wall thickness differences. Anterior block segments were found to have significantly larger LI drops (21.0 [15.9-27.2] O) than posterior block segments (16.6 [12.7-23.7] O, p<0.01). ROC analysis of segments with inter-lesion spacing =6mm identified optimal LI cut-off values of 16? in anterior segments and 11? posteriorly, which had positive predictive values for conduction block of 95.6% and 96.7%, respectively.

Conclusions: The magnitude of LI drop is predictive of acute PVI segment conduction block in patients with paroxysmal AF. The thinner posterior wall required smaller LI drops for block compared to the thicker anterior wall. With inter-lesion spacing of =6mm, reaching a LI drop of =16O anteriorly and =11? posteriorly was highly predictive of acute segment block in de novo PVI.





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