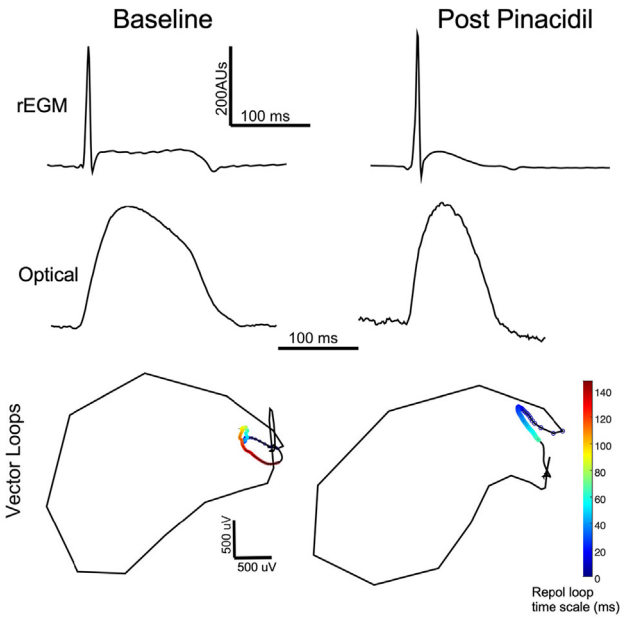

Figure 1. Illustrative example of rEGMs and associated voltage loops shown with fluorescence signals.
A: rEGM at baseline (left) and after pinacidil infuson (right).
B: Optical signals measured at same locations.
C: Vector loops obtained from orthogonal bipoles. Large component traced in black represents the QRS while the color coded segment illustrates the repolarization loop. Color depicts time of repolarization.

CE-520-03

USE OF RIPPLE MAPPING TO ENHANCE LOCALIZATION AND ABLATION OF OUTFLOW TRACT PREMATURE VENTRICULAR CONTRACTIONS

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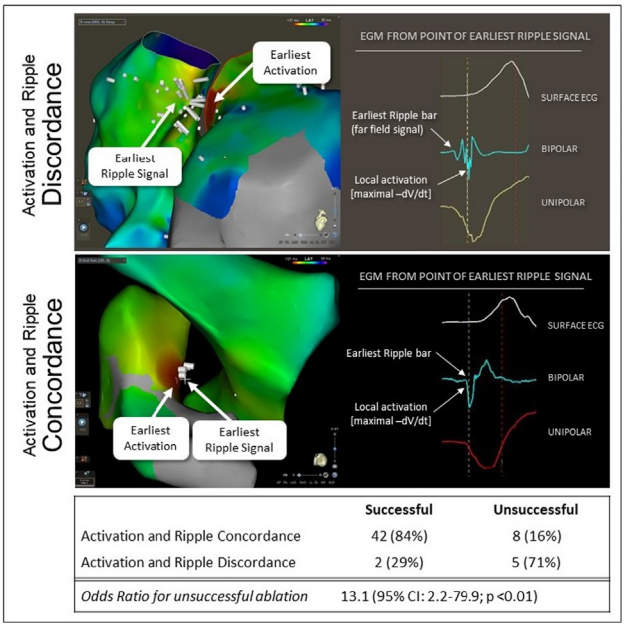
Background: Mapping outflow tract (OT) premature ventricular contractions (PVCs) can be difficult given a frequent mid-myocardial origin. Compared to local activation time mapping, Carto® Ripple Mapping provides visualization of both far field and near field signals independent of local annotation that may enhance PVC localization.
Objective: To evaluate the utility of Ripple mapping to localize OT PVCs.
Methods: Electroanatomic maps for consecutive OT PVC catheter ablation cases (July 2018-December 2020) were analyzed. For each PVC, we identified the earliest local activation point (EA), defined by the point of maximal -dV/dt in the unipolar electrogram (EGM) within each corresponding bipolar EGM, and the earliest Ripple signal (ERS), defined as the earliest point at which 3 grouped simultaneous Ripple bars appeared. Procedural success was defined as full suppression of the targeted PVC.
Results: 57 PVC maps were included. When ERS was in the same chamber (right ventricle, left ventricle, or coronary sinus) as EA, procedural success was 84%, versus 29% when discordant ($p < 0.01$) (Figure). Site discordance had an odds ratio for needing multisite ablation of 7.9 (95% confidence interval 1.4-4.6; $p = 0.02$) and for unsuccessful procedure of 13.1 (2.2-79.9; $p<0.01$). Median EA-ERS distance in successful and unsuccessful cases was 4.6 mm (interquartile range 2.9, 8.5) vs 12.5 mm (7.8, 18.5); ($p<0.01$). Positive predictive value for successful ablation with EA-ERS distance <10mm was 90% (79-95%, $p<0.01$).
Conclusion: Greater concordance between EA and ERS is associated with higher odds of successful OT PVC ablation. Visualization of far-field signals via Ripple mapping may offer localization information complementary to activation mapping for PVCs of mid-myocardial origin.



	Successful	Unsuccessful
Activation and Ripple Concordance	42 (84%)	8 (16%)
Activation and Ripple Discordance	2 (29%)	5 (71%)
Odds Ratio for unsuccessful ablation	13.1 (95% CI: 2.2-79.9; p <0.01)	

CE-520-04

FORWARD-SOLUTION COMPUTATIONAL ARRHYTHMIA SOURCE MAPPING: THE VMAP STUDY

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Background: The accuracy of arrhythmia source localization using a forward solution computational mapping system has not yet been evaluated in blinded, multicenter analysis.
Objective: The study tested the hypothesis that a computational mapping system using a comprehensive arrhythmia simulation library would provide accurate localization of the site of origin for atrial and ventricular arrhythmias and pacing using the 12-lead ECG compared with the gold standard of invasive electrophysiology study and ablation.
Methods: The VMAP study was a blinded, multicenter evaluation with final data analysis performed by an independent core laboratory. Eligible episodes included atrial and ventricular: tachycardia (VT), fibrillation, pacing, premature complexes (PACs and PVCs; figure panel A); and orthodromic atrioventricular reentrant tachycardia. Forward solution mapping system results (panel B) were compared with the gold standard site of successful ablation or pacing during invasive electrophysiology study and ablation (panel C). Mapping time performance was assessed from timestamped analysis logs. Pre-specified performance goals were used for statistical comparisons.
Results: A total of 255 episodes from 225 patients were enrolled from 4 study centers. Regional accuracy for VT and PVCs in patients without significant structural heart disease (n=75,