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Localization Of Accessory Pathways In Pediatric Patients With Wolff-Parkinson-White Syndrome Using 3D Rendered Electromechanical Wave Imaging

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Abstract:

Background: Electromechanical Wave Imaging (EWI) is a non-invasive imaging modality using a high frame rate ultrasound sequence to visualize cardiac electromechanical activation. This is the first study to utilize EWI in a pediatric population.

Objective: Prediction of accessory pathway (AP) location in Wolff-Parkinson-White (WPW) syndrome is frequently based on algorithmic analysis of electrocardiogram (ECG). These algorithms are less reliable in the pediatric population. This study tests the feasibility of using EWI for prediction of AP locations in pediatric patients.

Methods: Seven patients with manifest ventricular pre-excitation on resting ECG underwent transthoracic EWI prior to catheter ablation. Catheter mapping of the atrioventricular ring was obtained, and all patients had successful ablations of a single AP. 3D rendered EWI maps were generated and compared to intracardiac mapping and ablation. 12 lead ECG localization used the Boersma et al. algorithm. EWI was blinded to both catheter mapping and 12 lead ECG.

Results: Mean age was 13.8±0.1 years old with three male patients. Catheter mapping of the seven patients demonstrated three posteroseptal, two left posterolateral, one left lateral, and one anteroseptal accessory pathways. The Boersma et al. algorithm predicted six of the seven AP locations (86% accuracy). 3D rendered EWI correctly predicted 100% of AP locations. A representative image comparing a left posterolateral AP with the corresponding intracardiac map is shown (Figure 1).

Conclusion: EWI was capable of accurately predicting AP locations in pediatric patients with WPW. EWI could serve as a helpful treatment planning tool for these patients.

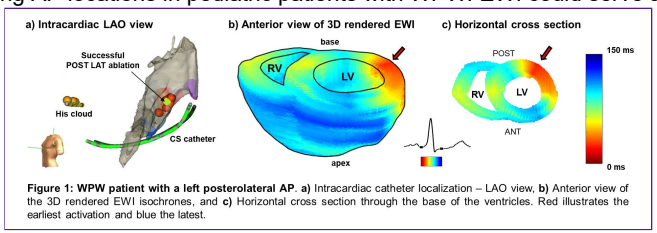

Figure 1: WPW patient with a left posterolateral AP. a) Intracardiac catheter localization – LAO view, **b)** Anterior view of the 3D rendered EWI isochrones, and **c)** Horizontal cross section through the base of the ventricles. Red illustrates the earliest activation and blue the latest.

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Author Disclosure Information:

L. Melki: None. **C.S. Grubb (co-first):** None. **E. Wan:** None. **H. Garan:** None. **E. Silver:** None. **E. Konofagou (co-senior):** None. **L. Liberman:** None.
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Additional Information (Complete):
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I am interested in submitting an abstract for one of the Late-Breaking Trials sessions.
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***Learning Objective:** : appraise the usefulness and accuracy of 3D rendered Electromechanical Wave Imaging in predicting accessory pathways in pediatric patients with WPW

Abstract Awards (Complete):
None : True

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