Electroanatomic Relief Mapping: Merging High Density Voltage Gradient Data on the Activation Map in Atrial Flutter Using an Impedance Based Mapping System.

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Introduction: High density (HD) mapping with multipolar catheters can quickly acquire thousands of data points simultaneously at each electroanatomic location. By doing so, we can identify critical channels of conduction which propagates the tachycardia. There may also be areas of low or high voltage or areas of block within a location which can be identified. Current mapping systems display the activation map and voltage map separately. We report on a novel method to merge the voltage gradient data with the activation data and display as an electroanatomic relief map.

Methods: This is a patient who underwent typical atrial flutter (AFL) cavotricuspid isthmus (CTI) ablation 6 months prior who had recurrent AFL and presented for repeat ablation. HD mapping of the CTI was performed using a multipolar catheter and impedance based mapping system. 2904 points were used to create this model. There was a line of block noted with breakthrough at the bottom of the CTI line near the IVC. Ablation at this area terminated the tachycardia. After the case was performed, the study was reviewed offline using proprietary research software. The voltage gradient data was merged on the activation map similar to a cartographic terrain or raised-relief 3D map, i.e. voltage is displayed as elevation along the z axis.

Result: The merged rendering of the map data makes it easier to visualize the areas of interest. In cases with multiple low voltage areas, we can quickly identify the areas which are part of the circuit and which are dead ends.

Conclusion: Merging HD voltage data on an LAT map and displaying the voltage data as a raised relief map makes it easier to visualize the area of interest and will likely assist in the future to improve the efficacy and efficiency of ablation.