Utility of novel Omnipolar activation mapping for the detection of ventricular premature contraction origin

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Background: Bipolar electrograms are significantly influenced by direction of the propagating wavefront in relation to the recording bipole. Omnipolar voltage mapping may be superior to standard bipolar mapping since it obtains maximum voltage of all possible bipolar electrode orientations without the need for catheter rotation. Therefore, omnipolar maps can provide voltage maps with larger voltages as well as better defined boundaries.

Purpose: Whether omnipolar activation maps also describe better activation maps versus traditional bipolar maps during ventricular premature contraction (VPC) catheter ablation is unclear.

Methods: A high-density mapping catheter was advanced to the ventricular outflow tract and a high-resolution activation map was created. Each electrode along and across the splines of the catheter are 4mm apart. Bipoles were calculated along (MAP 2), across (MAP 3) and bidirectional (MAP 4) the splines while omnipoles (MAP 1) were derived from a right triangle clique. Within a square area, four omnipolar and two bipolar values along, across and bidirectional values were defined.

Results: Though the earliest activation site was vague by along and across maps (arrow), white color became evident by bidirectional map, and the VPC origin became distinct with omnipolar mapping. RF lesions were given via an open-irrigated ablation catheter targeting a lesion size index 5.0. The VPC was eliminated by radiofrequency ablation.

Conclusion: Omnipolar activation mapping may be more accurate than traditional bipolar mapping during ventricular premature contraction (VPC) catheter ablation.

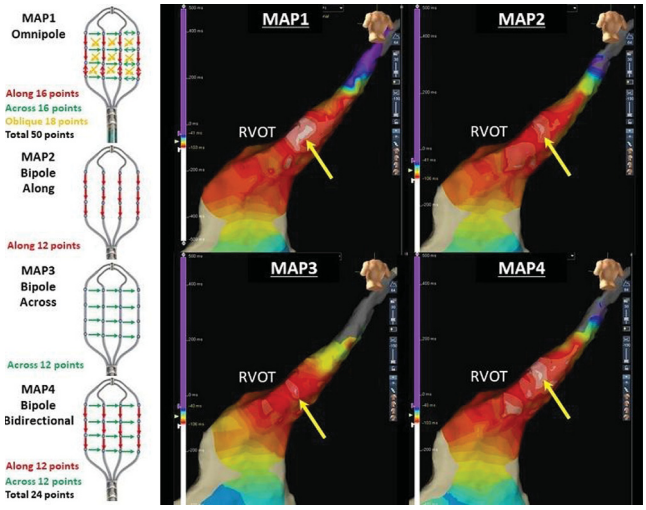

Figure 1