Novel 3-dimensional electroanatomic mapping software to find gap more easily compared with conventional software version: the early experience of high definition coloring

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Introduction: Signal-guided gap mapping is sometimes challenging even assisted by multi-electrode catheter and conventional 3-dimensional electroanatomical mapping (3D EAM) software. High definition (HD) coloring (Biosense Webster, Diamond Bar, CA), a new feature of 3D EAM system CARTO 3 version 6.0, allows the high-quality display of EAM and highlights areas of potential conduction block, called extended early-meets-late (EEML). We aimed to validate this software whether it could provide a better interpretation of the local activation time (LAT) and propagation map to find a gap.

Methods: This was a single-center retrospective analysis. We applied HD coloring in 15 patients with atrial fibrillation or atrial flutter for 17 lesions (7 for cavo-tricuspid isthmus [CTI] lines, 2 for roof linear lines, and 9 for pulmonary vein [PV] lesions). Pentaray catheter (Biosense Webster, Diamond Bar, CA) was used for 3D EAM mapping. In HD coloring map, lower threshold (LT) is the value of calculating LAT differences of 2 points to highlight areas of possible conduction block.

Result: In 3 lesions (2 for CTI and 1 for roof line), bidirectional block was displayed in white line in HD coloring map (Figure A). For 15 lesions (5 CTI lines, 9 PV lesions, and 1 roof line), we found gap sites using HD coloring module. Figure B and C showed right inferior PV gap after PV circumferential ablation and CTI gap after CTI ablation. HD coloring map was well-correlated with voltage map and ablation of these gap sites allowed to achieve linear line block or PV isolation immediately. Applying lower or higher LT compared to optimal LT might create “pseudo” conduction block in HD coloring map (Figure D).

Conclusion: Finding a gap site, the HD coloring module with multielectrode mapping technology provide additional map to find a gap area more easily after PV isolation or linear line ablation. Although there are a few pitfalls to avoid wrong interpretation, this novel module might shorten procedure time and help to facilitate effective ablation to achieve linear block or PV isolation.