Two cases of epicardial endocardial breakthrough during macroreentrant atrial tachycardia revealed by the RHYTHMIA mapping system.

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**Introduction**: The RHYTHMIA Mapping System (Boston Scientific) reveals epicardial endocardial breakthrough (EEB) in some cases of macroreentrant atrial tachycardia (MRAT), and EEB suggests an epicardial circuit of MRAT. However, there are no established treatment strategies for MRAT with EEB. We present two cases of successfully ablated MRAT with EEB.

**Methods**: N/A

**Result**: Case 1 is a 76-year-old man who presented with atrial tachycardia (AT) 6 months after tricuspid valve replacement and the right-sided Maze procedure. Although the RHYTHMIA Mapping System revealed the scar area along the cavo-tricuspid isthmus (CTI) ablation line by the previous right-sided Maze procedure, the activation map indicated CTI-dependent clockwise flutter, and EEB was detected at the lateral side of the CTI ablation line (Figure A). The differences between the post pacing interval (PPI) and the tachycardia cycle length (TCL) at the lateral tricuspid annulus and coronary sinus ostium were 18ms and 16ms, respectively. However, the PPI at just the lateral side of the CTI ablation line was 84ms longer than the TCL. Although radio frequency ablation to the EEB site was not effective, the tachycardia was terminated by mechanical bump just on the CTI ablation line. After several radio frequency applications to that area, the tachycardia was no longer induced, and bidirectional block of CTI ablation line was confirmed. Case 2 is a 70-year-old man who presented with AT after pulmonary vein isolation and roof line linear ablation using a cryoballoon system. The RHYTHMIA Mapping System revealed the scar area along the roof line. However, activation map suggested roof-dependent AT, and EEB was confirmed at the anterior side of the roof line (Figure B). The differences between the PPI and the TCL at the left atrial anterior wall and the left atrial posterior wall were 4ms and 2ms, respectively. Although pacing from just the anterior side of the roof line was not captured, the AT terminated in 2.4 seconds with TCL prolongation by radio frequency application to that point, and bidirectional block of the roof line was confirmed.

**Conclusion**: In MRAT with EEB, an epicardial critical isthmus estimated by the RHYTHMIA mapping system could be an ablation target, even if a pacing was not captured or the PPI was long.