A case of Ripple mapping in postoperative atrial tachycardia in patient with mitral valve surgery and Cox-Maze IV procedure

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Introduction: Atypical macroreentrant atrial arrhythmia (AT) is frequently related to a history of open heart surgery, which has become an increasingly prevalent arrhythmia in many patients. However, its diagnosis as well as catheter ablation remains a challenge. In this report, we present a unique case of a macroreentrant atrial tachycardia involving the mitral annulus (MA), which developed after surgical intervention for a mitral valve replacement and catheter ablation of typical atrial flutter.

Methods: We herein report a case of a 56-year-old man with rheumatic heart disease and atrial fibrillation underwent simultaneous mechanical mitral valve replacement and tricuspid valve repair with concomitant modified Cox-Maze IV procedure. After 2 years of open heart surgery, the patient underwent a percutaneous cavotricuspid isthmus (CTI) catheter ablation procedure because of typical atrial flutter. And the patient had a recurrence of atrial tachycardia after 10 months of CTI ablation and required repeat procedure. Ripple mapping of the left atrial (LA) and right atrial (RA) was performed to identify the correct target for ablation.

Result: The Ripple mapping showed the single-loop macroreentrant circuits using the MA and implied the presence of the slow conduction in the mitral isthmus, where the activation wavefront arised from MA going along the anterior wall of the LA, subsequently turning over the RA septal and extending toward the proximal to distal in the CS opposite of posterior wall of MA in counter-clockwise rotation. Continuous linear radiofrequency catheter ablation of the mitral isthmus was performed, resulting in cycle length prolongation and termination to sinus rhythm. Bidirectional block across the mitral isthmus was achieved and noninducibility of any SVT was confirmed by burst atrial pacing after tachycardia termination.

Conclusion: Previous studies have shown that, in patients with prior MV surgery and regular ATs, macroreentry is the predominant arrhythmia mechanism. Ripple mapping identified the correct target for ablation with high diagnostic confidence in a case of complex AT after heart surgery.