Occurrence of Epicardial Annular VT After Successful Ablation of the Ventricular Tachycardia in Cardiac Crux. Is It One VT With Two Exit Sites?

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Abstract

Introduction: Ventricular tachycardia (VT) originating from cardiac crux is a rare form of VT that appears in normal heart. Occurrence of another VT in conjunction with this type of VT has not been reported in the literature.

Case Presentation: A 35-year-old male with frequent episodes of sudden onset palpitation without structural heart disease showed two forms of rare VTs in electrophysiological study (EPS).

Conclusions: Idiopathic annular VT usually originates from endocardial surface of mitral or tricuspid annulus. Occurrence of VT in epicardial part of cardiac summit around middle cardiac vein (near mitral annulus or cardiac crux) is very rare. Occurrence of second epicardial annular VT after ablation of clinical VT is not reported. This event can be explained by the change of VT focus after initial ablation.

Keywords: Cardiac Crux, Epicardial Ablation, Ventricular Tachycardia

1. Introduction

Ventricular tachycardia (VT) originating from cardiac crux is a rare form of VT that appears in normal heart. Occurrence of another VT in conjunction with this type of VT not reported in the literature.

2. Case Presentation

A 35-year-old male presented with sudden onset palpitations from two years ago. Past medical history was negative. Baseline electrocardiogram (ECG) was normal. He had normal echocardiographic findings. Electrophysiological study (EPS) was planned for the patient that showed a wide QRS tachycardia with left bundle branch block (LBBB) pattern in V1, superior axis and breakthrough in V2 (R > S) compatible with that of the VT originating from cardiac crux (Figure 1A). The earliest ventricular signal was recorded in middle cardiac vein. Radiofrequency (RF) catheter ablation via middle cardiac vein was unsuccessful. Epicardial access was obtained. VT was eliminated with RF ablation application in epicardial surface near middle cardiac vein (Figures 1B and 2A). Successful ablation site was 3 mm far from the posterior descending artery. Then, VT induction was done and surprisingly another VT with positive QRS complex in lateral precordial leads and superior axis was induced. VT morphology was compatible with that of the one originating from posteroseptal part of mitral ring or basal crux (Figure 1C - D). Femoral access was obtained. Ablation in posteroseptal part of mitral ring was unsuccessful. Mapping in epicardial part of mitral ring via coronary sinus demonstrated good signal. Successful RF ablation was done within coronary sinus (CS) ostium in basal crux (Figure 2B).

3. Discussion

Idiopathic premature ventricular contractions (PVCs) or VTs usually have endocardial origin in the right ventricular outflow tract and left ventricular cavity. Almost 15% of the idiopathic ventricular arrhythmias have an epicardial origin. ECG findings can help to differentiate epicardial from endocardial ventricular arrhythmias. The cardiac crux is a region located in posterior septal part of the heart and surrounded by four cardiac chambers.

VT originating from cardiac crux is a rare form of idiopathic VT with the characteristic appearance of left bundle branch block pattern in V1, superior axis and breakthrough in V2 (R > S). Although in cardiac crux VT, ablation is started from middle cardiac vein, most probably an epicardial approach is needed. The mechanism of these two different
Figure 1. A, The 12-lead ECG of the patient shows cardiac crux ventricular tachycardia with characteristics pattern in precordial leads; B, Intra-cardiac tracing shows successful signal of the aforementioned patient; C, The 12-lead ECG of the patient after successful ablation of the cardiac crux VT with different QRS pattern in precordial leads; D, Successful intra-cardiac signal of the second VT.

Patterns of VT can be explained by the presence of two separate arrhythmia foci or one VT with two exit site. Appearance...
Figure 2. A, The image shows successful ablation site of clinical ventricular tachycardia originating from cardiac crux; B, Successful ablation site of the second VT.

ance of the second VT in the current report patient may be related to the change of VT exit, because successful ablation site of both VTs are close. There is no report in the literature indicating the occurrence of these two infrequent types of VT.

Kawamura et al. divided cardiac crux VT into two groups, apical versus basal crux and concluded that ablation via middle cardiac vein was effective in eliminating basal crux VT whereas apical crux VT often requires a subxiphoid epicardial approach (1-3).

Footnote

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References