CASE REPORT

Idiopathic epicardial ventricular tachycardia from the coronary venous system: From electrocardiographic recognition to appropriate therapy

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Idiopathic epicardial ventricular tachycardias (VTs) account for 9% of idiopathic VTs. The recognition of this entity is important, as a minimally invasive ablation procedure performed exclusively through the coronary sinus branches may be considered, avoiding the potential risks associated with access to the left ventricular endocardium, the aortic root, and the pericardial space. The electrocardiographic features and therapeutic management of this rare form of tachycardia are discussed.

KEYWORDS

catheter ablation, coronary sinus, epicardial, great cardiac vein, idiopathic, ventricular tachycardia

1. | INTRODUCTION

A 53-year-old male without any significant medical history was admitted for palpitations. The heart rate was 105 bpm and the blood pressure was normal. The presenting electrocardiogram demonstrated a wide complex tachycardia with right bundle branch block morphology and positive precordial concordance (Figure 1). Atrioventricular dissociation was noted (lead V₄) and adenosine infusion did not affect the tachycardia. Thus, a diagnosis of ventricular tachycardia (VT) was made, originating from the antero-latero-basal aspect of the left ventricle. A thorough analysis of the ECG demonstrated a pseudodelta wave (leads V₃–V₆), a maximum deflection index >0.55, RS complex duration >121 ms, and an intrinsicoid deflection time >70 ms, all these criteria being suggestive of an epicardial origin. Echocardiography was strictly normal. At this stage, a diagnosis of idiopathic epicardial VT was made. After failure of β -blocker therapy, VT ablation was considered. Given the index ECG indicative of an epicardial focus, an endocardial approach was deemed futile, due to its very low chance of success. Moreover, we felt that the risks associated with a percutaneous subxyphoid approach of the pericardial space outweighed the benefits of such a procedure. Consequently, based on ECG analysis, it was decided to perform a minimally invasive, purely venous procedure, without any access to the left ventricular endocardium, the

aortic root, and the pericardial space, so as to avoid the potential risks associated with access to each of these structures. After venous femoral access, an occlusive venogram of the branches of the coronary sinus was performed (Figure 2b). Detailed activation mapping of the CVS demonstrated an exit site located at the junction between the great cardiac vein and the anterior interventricular vein (Figure 2d). At that site, the earliest local activation time preceded the QRS onset by 40 ms and a QS complex was observed in the unipolar signal. Furthermore, pace mapping at that site demonstrated a 12/12 correlation. Coronary angiography demonstrated a sufficient safety distance from the site of earliest activation to the coronary arteries (Figure 2a and c). Radiofrequency delivery at that site (open irrigated-tip catheter Tactiath, Saint Jude Medical; 30 W, 60 s, irrigation flow=30 ml/min) terminated the tachycardia within a few seconds. The impedance was 150 Ohms and a 15 Ohms drop was observed during RF delivery. Post ablation, ECG, echocardiography, and cardiac magnetic resonance imaging were normal, and no VT recurrence was noted at 6 months of follow-up.

Idiopathic epicardial VTs can be successfully ablated from the coronary venous system. The recognition of this rare entity is important, as it can change the therapeutic strategy. Several electrocardiographic criteria have been reported for the diagnosis of an epicardial origin of these VTs, namely the pseudodelta wave, the maximum deflection index, the

FIGURE 1 Twelve-lead electrocardiogram

FIGURE 2 Coronary angiogram (a and c), coronary venous system opacification (b), activation map within the coronary sinus (d)

RS complex duration time, and the intrinsicoid deflection time (Chen & Lin, 2015; Mountantonakis et al., 2015; Steven et al., 2013). When the electrocardiogram is highly suggestive of such a diagnosis, catheter

ablation through a minimally invasive approach may be considered, avoiding the potential complications associated with access to the left ventricular endocardium, the aortic root, and the pericardial space.

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CONFLICT OF INTEREST

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