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The Width of Life Is More Important Than the Length of Life

IMAGES IN CARDIAC ELECTROPHYSIOLOGY

A 58-year-old man with previous inferior myocardial infarction (MI) was referred for cardiac resynchronization therapy pacemaker (CRT-P) for decreased left ventricular ejection fraction (LVEF; 45%) and left bundle branch block (LBBB) (Figure 1). He had New York Heart Association Class I functional classification but palpitation for 3 months. General physical and cardiac examinations were normal. On the admission day, the electrocardiogram showed a narrow QRS rhythm with and without tachycardia (Figures 2 and 3). Would you recommend or consider a CRT-P device or a CRT defibrillator or only an implantable cardioverter defibrillator (ICD) based on these clinical and electrocardiographic findings, or ablation or medical therapy only?

DISCUSSION

Apparently, at first glance, the patient had sinus rhythm with LBBB who was a suitable CRT-P due to his heart failure with mildly reduced LVEF (HFmrEF). However, one might argue for this indication when considering the patient's asymptomatic status. On the other side, the comparison of the QRS complex between the tachycardia and those in sinus rhythm gives us important clue because a QRS complex that is narrower during tachycardia (Figures 2 and 3) than during sinus rhythm (Figure 1) establishes the diagnosis of ventricular tachycardia (VT).[1] This is an important but rare clue occurring in less than 1% of VTs.[2] If myocardial septal VTs are close to the His-Purkinje conduction system (HPS) and capture it, the QRS tends to be narrow. Indeed, this Purkinje network plays a pivotal role not only in the triggering but also in the perpetuation of ventricular arrhythmias.[3-9] In the current case, the electrophysiological study confirmed VT, and activation mapping demonstrated a critical isthmus within an area of scar involving the HPS accounting for the narrow QRS morphology (Figure 4). The beat-to-beat subtle changes in QRS morphology suggest subtle degrees of fusion of myocardial and HPS activation (Figure 3).

Many of the unanswered questions regarding the primary prevention of sudden cardiac death include the optimal timing of ICD implant after MI or after the first diagnosis of HF and the optimal LVEF cut-off able to identify high-risk patients. Especially, no data is supporting primary prophylactic ICD implantation in post-MI patients with preserved or HFmrEF. On the other side, no discussion for secondary prevention of sudden cardiac death that occurred in the absence of reversible causes in post-MI patients is present. However, the new 2022 The European Society of Cardiology (ESC) ventricular arrhythmia guideline recommends that VT ablation is an option for the treatment of hemodynamically well-tolerated VT even without ICD back-up.[10] We preferred to implant an ICD in this asymptomatic post-MI patient after successful VT ablation. This case highlights the importance of the width of QRS in the differential diagnosis. The width of the QRS complex during VT is influenced by the site of VT origin, the timing of engagement of the

SCIENTIFIC LETTER

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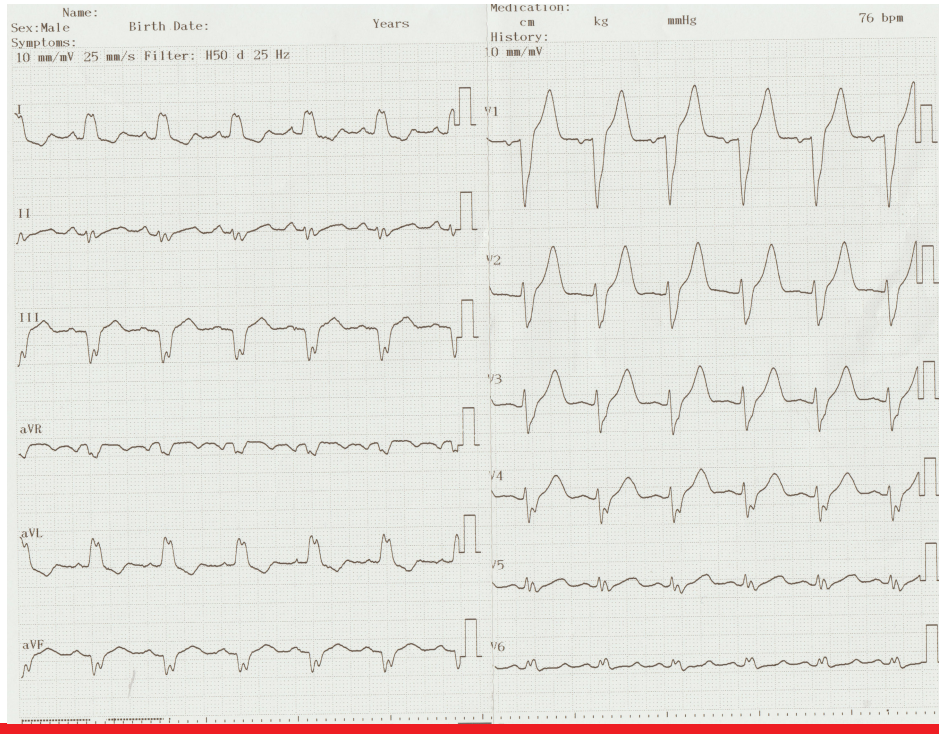

Figure 1. Twelve-lead electrocardiogram taken in an outpatient clinic from the patient referred for cardiac resynchronization therapy pacemaker (CRT-P) implant.

HPS, the burden of intramyocardial scar, and the presence of antiarrhythmic drugs used. In that context, even though the QRS duration is relatively narrow to be mistaken for supraventricular tachycardia, the comparison of the QRS complex between tachycardia (narrow) and sinus rhythm (wide) is an important clue since the QRS complex that is

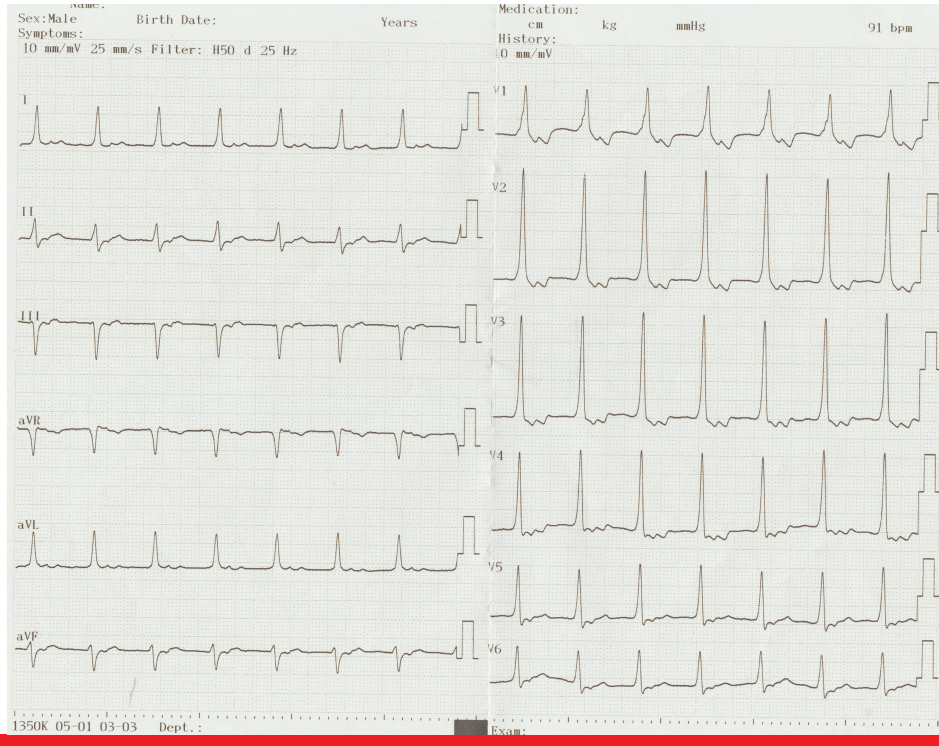

Figure 2. Twelve-lead electrocardiogram taken on admission to hospital.

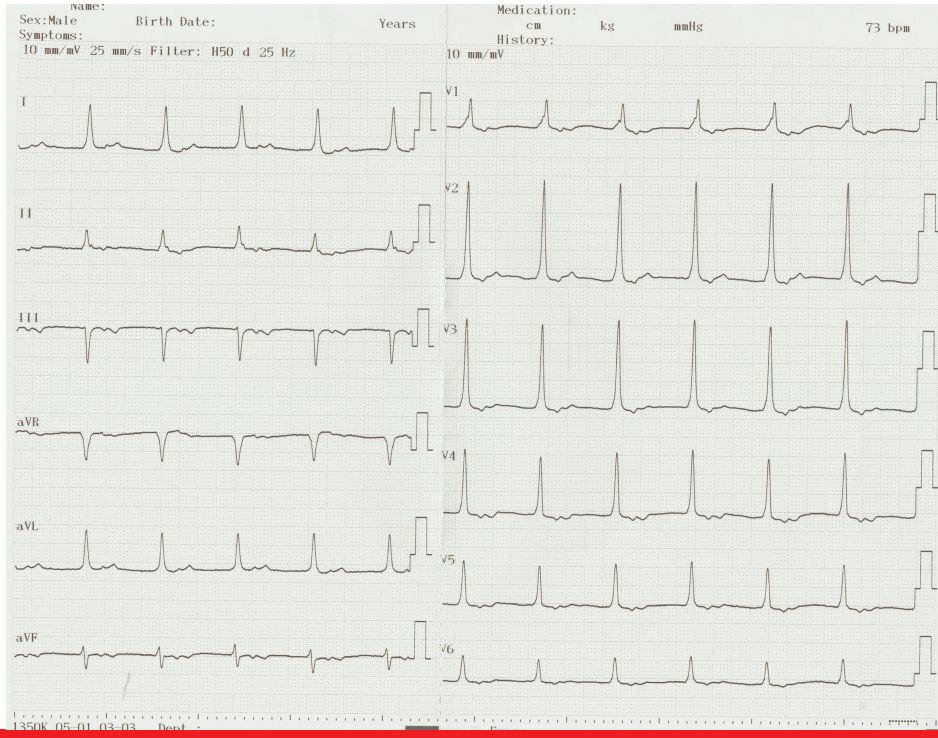

Figure 3. Twelve-lead electrocardiogram taken on admission to hospital.

narrower during tachycardia compared to sinus establishes the diagnosis of VT. Therefore, narrow complex VT should be included in the differential diagnosis of any tachycardia in post-MI patients. The width of QRS is important, but as Ibn Sina (Avicenna) once said, *"Width of life is more important than the length of life."*

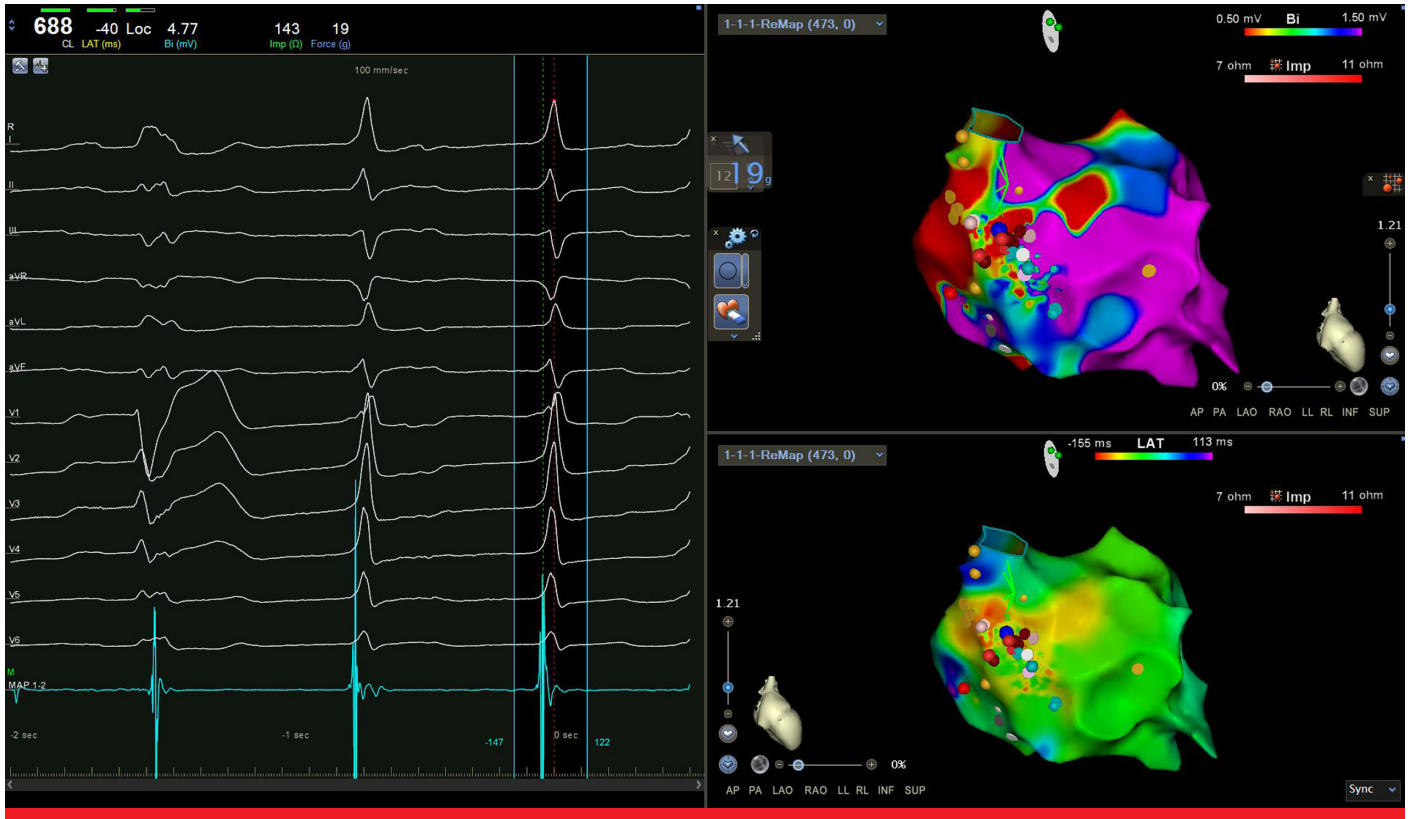

Figure 4. Three-dimensional mapping shows the successful ablation point at the parahisian septum.

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