



Case Report

The coexistence of Wolff-Parkinson-White syndrome (WPW) and atrioventricular nodal reentrant tachycardia (AVNRT)

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ABSTRACT

Atrioventricular nodal reentrant tachycardia (AVNRT) is the most common type of reentrant paroxysmal supraventricular tachycardia that occurs in the presence of dual AV nodal physiology. Wolff-Parkinson-White (WPW) syndrome is another type of supraventricular tachycardia characterized by short PR intervals, delta waves and wide QRS complexes on the surface electrocardiogram (ECG), reflecting atrioventricular pre-excitation. Uncommonly, AV nodal reentry and accessory pathways can coexist. In this case report, we present a patient who had frequent episodes of palpitation and syncope and recently presented to the emergency department (ED) with the complaint of dizziness. We performed successful radiofrequency (RF) catheter ablation of mitral annulus posterolateral accessory pathway and AVNRT which was the cause of the second tachycardia induced during the same session.

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1. Introduction

Atrioventricular nodal reentrant tachycardia (AVNRT) is the most common type of reentrant paroxysmal supraventricular tachycardia that occurs in the presence of two different pathways with different conduction rates and refractory periods in the AV node (dual AV nodal physiology). Radiofrequency (RF) catheter ablation is the treatment method in most cases with acceptable success rates.¹ Wolff-Parkinson-White (WPW) syndrome is a supraventricular tachycardia syndrome in which a reentry occurs between the physiological conduction system of the heart and a pathological accessory pathway.² Rarely, AV nodal reentry and accessory pathway may present concurrently.³

Here, we report a case of successfully ablated manifest accessory pathway and coexisting slow pathway causing AVNRT induced in the same ablation session.

2. Case presentation

A 36-year-old female patient who had frequent episodes of palpitation and syncope presented to the ED with a complaint of dizziness. Cardiovascular physical examination was normal. The 12-lead electrocardiogram (ECG) was in sinus rhythm, and it revealed a short PR interval with slightly pre-excited QRS morphology, particularly in the anterior derivations, and R/S ratio > 1 in V1. No structural abnormality was observed on transthoracic echocardiographic examination.

After obtaining informed consent, electrophysiological study was performed in the symptomatic patient. Multipolar diagnostic catheters were positioned at the high right atrium (HRA) and the coronary sinus (CS). With programmed electrical stimulations performed both from HRA and CS, tachycardia was not induced. Atrial and CS burst pacings didn't help either. Anterograde refractoriness of the accessory pathway was evaluated and the effective refractory period (AP-ERP) of the accessory pathway was found to be 280 msec. We decided to perform accessory pathway ablation regarding the patient's recurrent complaints of palpitation and syncope and due to the AP-ERP, which was found to be relatively short. Activation mapping in CS showed that the earliest ventricular activation and also the shortest AV interval was in the posterolateral part of the mitral annulus (Fig. 1A–B). With retrograde aortic

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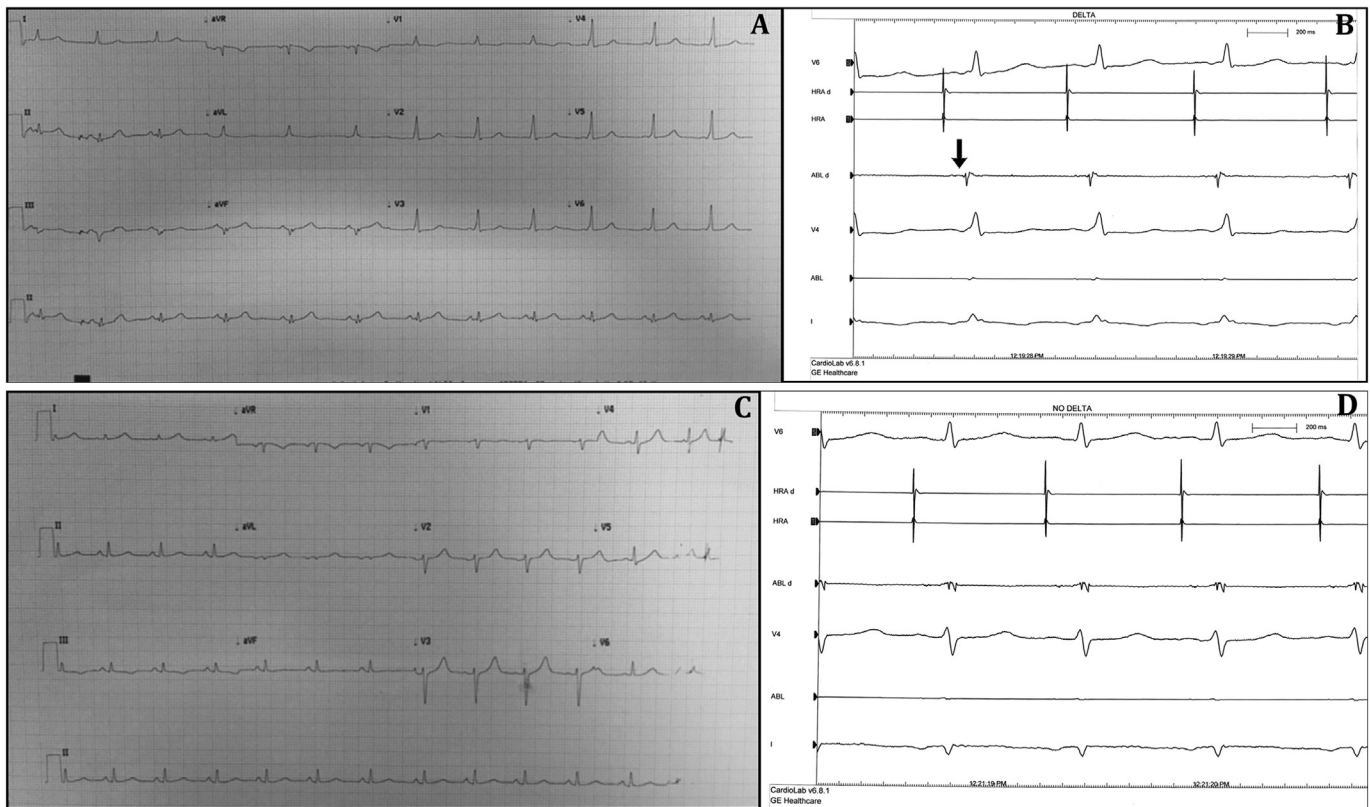


Fig. 1. A–B: Wolff-Parkinson-White pattern found on baseline ECG and local ventricular activity (black arrow) recorded at the earliest activation site with the shortest AV interval. C–D: Delta wave was disappeared following radiofrequency (RF) ablation in surface ECG and electrogram recordings.

approach, a 110 cm 7F flexible quadripolar ablation catheter with 4-mm distal tip was advanced in the left ventricle. Accessory pathway ablation was performed with 50 Watts, 60 °C RF energy in the posterolateral localization. Delta wave disappeared abruptly in the first 5 seconds of the RF ablation (Fig. 1C–D). Subsequently, application of RF energy was continued for a total of 60 seconds. The patient was monitored for about 20 minutes in terms of recurrence of delta wave. To check retrograde conduction of the accessory pathway, incremental ramp pacing from the right ventricular apex was performed. Meanwhile, a narrow QRS tachycardia with a septal VA time of 50 msec was induced (Fig. 2). Retrograde atrial activation showed concentric pattern during tachycardia with the earliest retrograde atrial activity to be in the His recording site. During tachycardia, His-refractory premature ventricular contraction (PVC) was delivered to differentiate between typical AVNRT and orthodromic AV reentrant tachycardia (AVRT) caused by a concealed accessory pathway with septal localization. Atrial activation was not advanced with the His-refractory PVC delivery. In order to entrain the reentry circuit, the ventricle was paced at a cycle length (CL) 30 msec less than TCL, with the aim of accelerating the atrium to the pacing CL. After successfully entrainment, post pacing interval (PPI) minus TCL was found to be 145 msec. Along with this value, a septal VA time of 50 msec and His-refractory PVC response were all clues of typical AVNRT. Thereupon, slow pathway ablation was performed for 60 seconds with 50 Watts, 50 °C RF energy in the right posteroseptal region where an appropriate A/V electrogram ratio was seen and a fragment atrial electrogram was observed. Junctional rhythm was observed during RF ablation. After slow pathway ablation, tachycardia was not induced with programmed atrial and ventricular electrical stimulations. In the 3-

month follow-up period, the patient was asymptomatic and delta wave was not observed on ECG.

3. Discussion

AVNRT is the most common type of paroxysmal supraventricular tachycardia with narrow QRS complex. Although dual AV nodal physiology should absolutely be present in patients with AVNRT, AVNRT may not occur in each patient with dual AV nodal physiology. Poor conduction in the retrograde fast pathway prevents occurrence of AVNRT in most individuals.⁴ WPW syndrome is an electrophysiological abnormality characterized with short PR interval, delta wave and wide QRS complex on surface ECG due to the presence of atrioventricular preexcitation. The most common type of tachycardia in individuals with WPW syndrome is orthodromic AVRT where the normal conduction system constitutes the anterograde pathway and the accessory pathway constitutes the retrograde one.² In addition, it has also been reported that dual AV nodal physiology may be present in 10% of the patients with WPW syndrome. Hence, though rarely, AVNRT episodes where the accessory pathway is not included in the reentrant circuit may be observed in these patients with WPW syndrome. In our case, manifest accessory pathway was localized in the posterolateral part of the mitral annulus and delta wave disappeared with the application of appropriate RF energy delivered to this region. However, a second narrow QRS tachycardia with concentric retrograde activation properties where the septal VA time was 50 msec was induced during ventricular pacing after first ablation. Electrophysiological properties were consistent with typical AVNRT. Thereafter, slow pathway ablation was performed successfully in the same session.

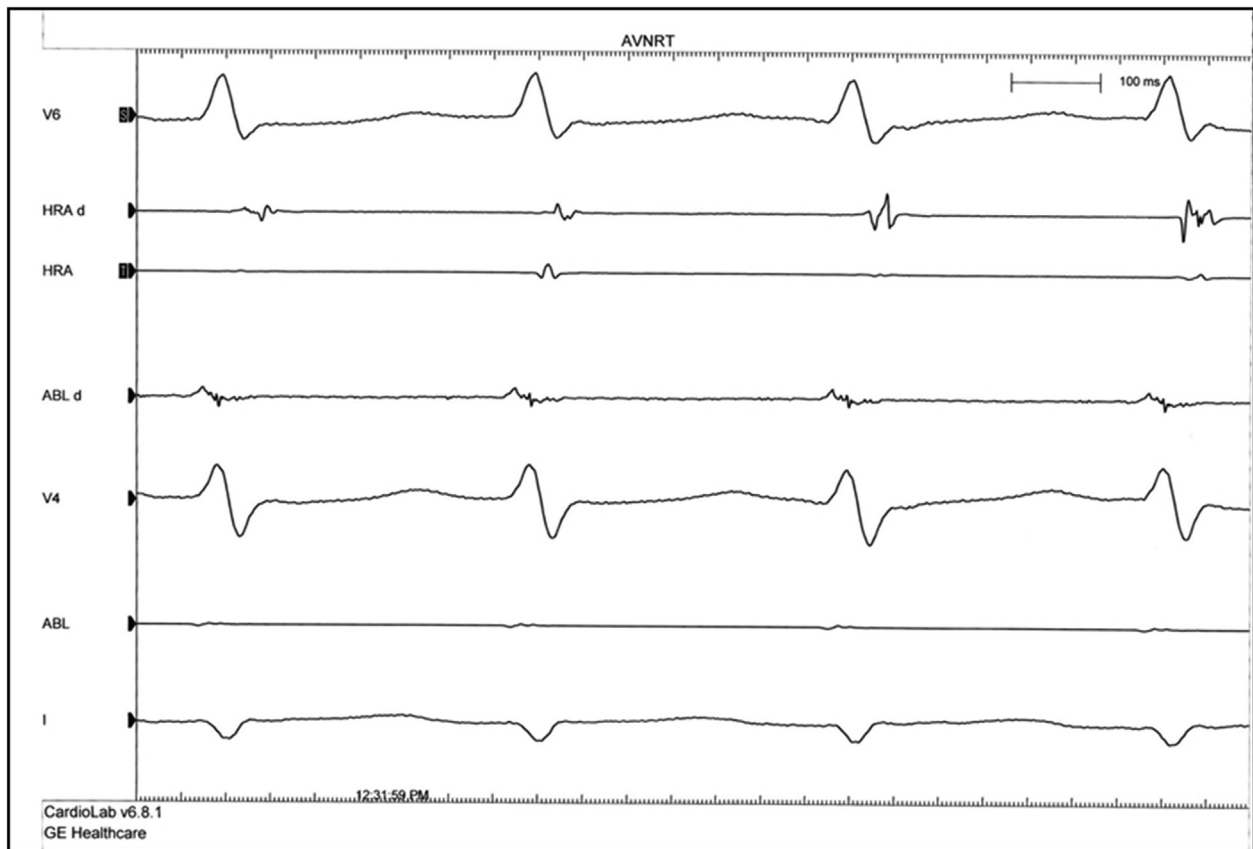


Fig. 2. Electrogram recordings of AVNRT induced at the same session.

In a study conducted by Kuo et al.,⁵ the incidence of dual tachycardias induced by various methods was reported to be 2.6% in patients with paroxysmal supraventricular tachycardia and it was shown that it might be beneficial to investigate a second tachycardia with programmed electrical stimulation method. Also in the study, it was reported that after the ablation of AVRT, typical AVNRT which could be induced with programmed electrical stimulation was ablated successfully. In our patient, we considered it wise to perform the ablation of the manifest accessory pathway primarily due to the recurrent palpitations and syncope episodes of the patient, relatively short AP-ERP and due to potentiality of ventricular fibrillation and death which could occur in symptomatic WPW patients. Subsequently, we performed simultaneously slow pathway ablation in the single session, because an inducible second tachycardia episode was diagnosed similar to the above mentioned study.

4. Conclusion

In our case, we performed successful RF catheter ablation of both manifest left posterolateral accessory pathway and coexisted

slow pathway causing AVNRT which were induced in the same session. Though the incidence is low, likelihood of a second tachycardia should be considered in patients with paroxysmal supraventricular tachycardia and all efforts should be made to induce another possible tachycardia after making sure the first one was ablated successfully.

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