

Radiofrequency Catheter Ablation of Parahisian Accessory Pathway

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ABSTRACT

Radiofrequency catheter ablation of parahisian accessory pathways in pre-excitation syndrome is a challenging task, due to the extremely high risk of complete atrioventricular block. In this brief report we describe the case of a 32 year-old man presenting a parahisian accessory pathway, who has been successfully treated by radiofrequency ablation. Radiofrequency catheter ablation using low-power radiofrequency current is considered to be the most appropriate method of ablation in adult patients.

Keywords: pre-excitation, parahisian accessory pathway, ablation, low-power radiofrequency current, right bundle branch block

INTRODUCTION

Palpitation is a common symptom of Wolf-Parkinson White (WPW) syndrome. The presence of an accessory pathway (AP) contributes to the occurrence of episodes of atrioventricular (AV) re-entrant tachycardias, usually via the orthodromic type of re-entry mechanism.^{1,2} In the general population, the prevalence of accessory pathway is 0.15% to 0.25%.^{3,4} In pre-excitation syndromes radiofrequency (RF) catheter ablation is nowadays the routine treatment for AP-facilitated tachycardias.⁵

Accessory pathways may be located close to the His bundle and the AV node, in the anteroseptal, midseptal, and parahisian regions. The ablation of these pathways is associated with a high risk of complete heart block, due to its proximity to the atrioventricular node.^{2,6-9}

In this case report, we describe the case of a patient with intermittent pre-excitation syndrome, caused by a parahisian accessory pathway.

CASE REPORT

A 32 year-old man, a professional driver, presented to our hospital with recurrent palpitations with sudden onset and termination, and two unregistered presyn-

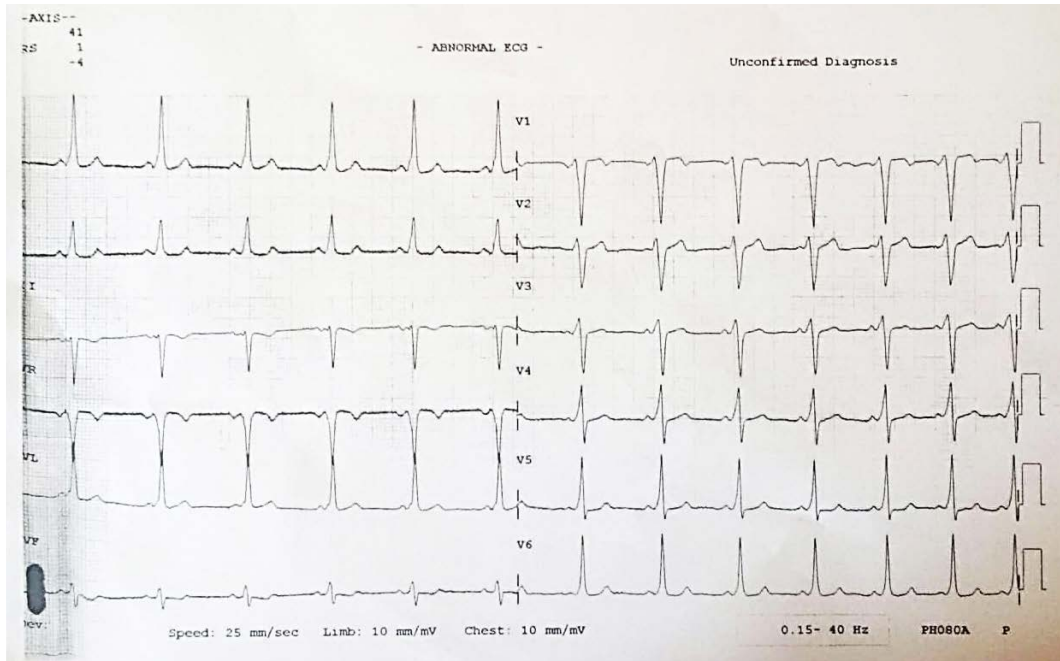


FIGURE 1. 12-lead surface ECG showing sinus rhythm with delta-wave suggesting the existence of a right anteroseptal accessory pathway

copal episodes in the last year. The physical examination findings were normal, blood pressure was 110/64 mmHg with pulse rate of 64 beats per minute (bpm). Electrocardiogram (Figure 1) showed sinus rhythm with short PQ interval, suggesting the presence of a right anteroseptal accessory pathway. Echocardiography described a struc-

turally normal heart. Laboratory examination revealed normal serum electrolytes values. The informed consent was obtained from the patient for publication of this case report and any accompanying images. The publication of this case was accepted by the Ethics Committee of the Cardio Med Medical Center.



FIGURE 2. Basic electrophysiological recordings during sinus rhythm. Delta wave on DII lead (yellow arrow). The His electrode (HBE) records intermittent pre-excitations with shortening of H-V interval from 77 msec to 13 msec (white and red arrows).

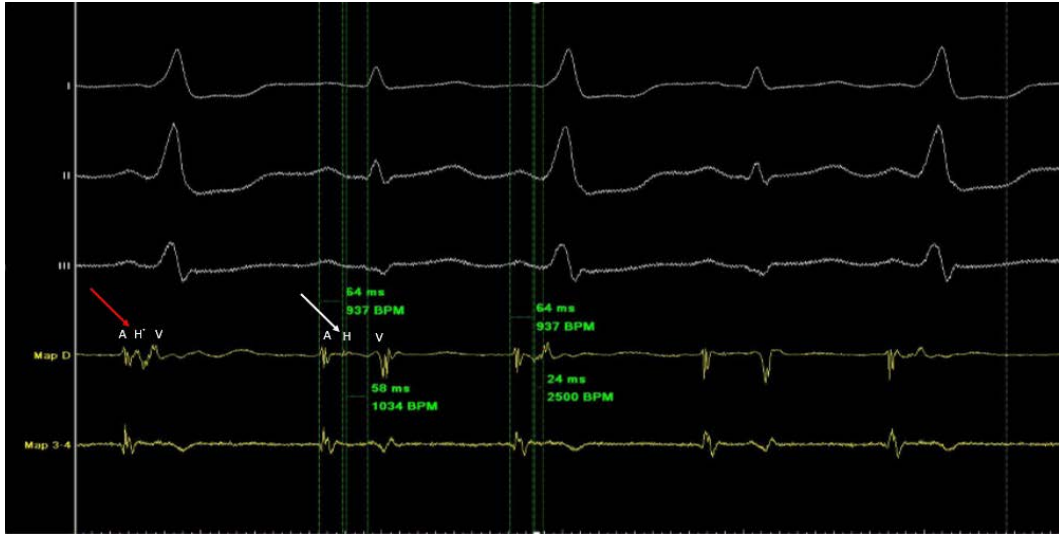


FIGURE 3. Consistent spike of electrical activity in the form of a His-like (H') wave on ablation catheter, the H' appearing in the same time with the delta-wave on the surface ECG (red arrow). HV interval is 58 msec in normal conduction (white arrow) and H'V interval shortening to 24 msec in pre-excitation.

After obtaining written consent, an electrophysiological study (EPS) was performed. After right femoral vein puncture, we introduced three quadripolar catheters in the high right atrium, His-bundle area and right ventricular apex (ablation catheter), and a steerable decapolar catheter into the coronary sinus.

Basic electrophysiological recordings (Figure 2) showed intermittent pre-excitations on the His catheter with shortening of the H-V interval from 77 msec to 13

msec. The presence of His-like wave (H') on the ablation catheter (Figure 3), confirmed that the AP was very close to the His-bundle. During the EPS we could not induce re-entrant tachycardia, but considering the patient's occupation and his medical history (two presyncopal episodes), after informing the patient on the very high risk for complete AV block during the ablation, which would require the implantation of a permanent pacemaker, the ablation was performed.



FIGURE 4. The distal tip the ablation catheter is positioned (red arrow) in the inferior area of anteroseptal region, close to the right ventricle.

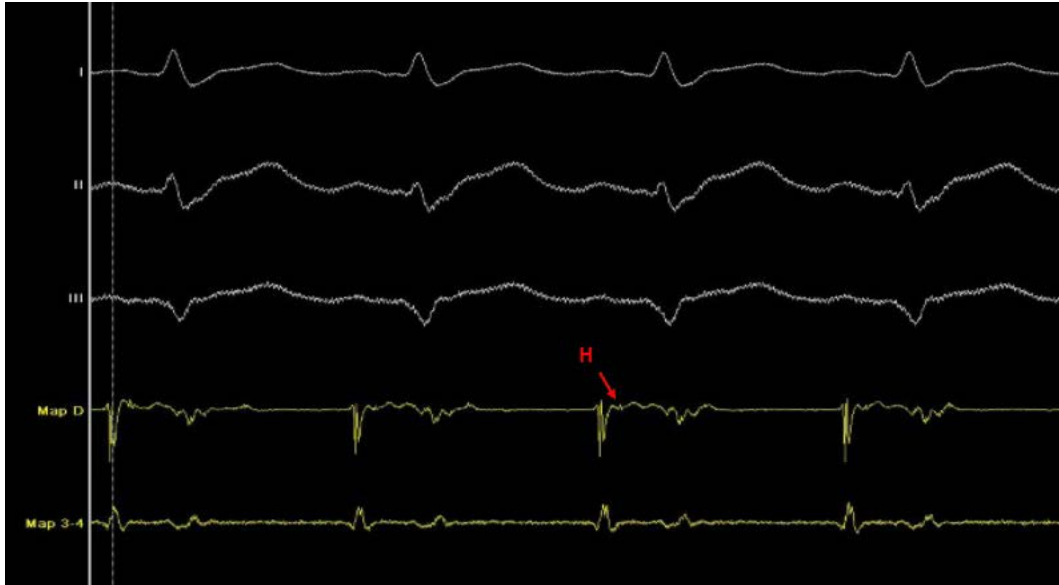


FIGURE 5. Post-ablation ECG with His-sign and right bundle branch block, without AV block

We positioned a 4 mm deflectable tip ablation catheter (M size, Saint Jude Therapy Ablation) in the right antero-septal region (Figure 4). The applied radiofrequency current power was progressively increased from 10 W to 35 W and the temperature limit was 45 °C. The parahisian AP ablation was successful (Figure 5) after the fourth attempt with a power of 35 W and temperature of 45 °C, with right bundle branch block on the post-ablation ECG.

The patient was discharged at day 3 post-ablation in a good general state, without recurrence of any symptoms and without any signs of pre-excitation on surface ECG (Figure 6).

At the 1 month follow-up the patient presented without symptoms or any sustained palpitations, 12-lead ECG showed sinus rhythm, RBBB and a normal PR interval.

DISCUSSION

The ablation of accessory pathways is the recommended treatment in patients who present with episodes of supraventricular tachycardias, but it is also indicated in the case of asymptomatic patients with an ECG pattern of Wolff-Parkinson-White syndrome, when an EPS proves the relatively short anterograde refractory period of the accessory pathway.¹⁰ Accessory pathway ablation has a 95–99% success rate with a recurrence of 5–10%.^{10–14} A severe complication is the complete AV block resulting in the need for permanent pacemaker implantation.

In order to reduce the risk of complications, ablation using lower energy levels can be performed⁶, based on cryothermia-based mapping¹⁵ or magnetic navigation.¹⁶

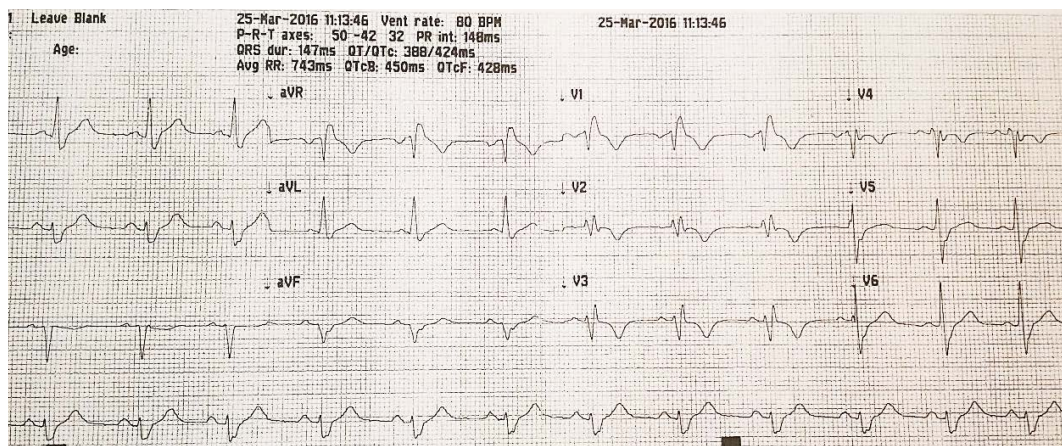


FIGURE 6. 12-lead ECG after the successful ablation, showing sinus rhythm, right bundle branch block, and no pre-excitation.

The precise classification of the pathways in the above locations using only surface ECG is not possible, despite the existence of dedicated algorithms, since the proposed criteria are not absolutely specific for the sites they refer to.^{10,17-19} Previous reports demonstrate that the risk of causing complete AV block is around 36% in the case of pathways located close to the normal AV conduction system.^{6,7,14,20,21} According to the standard classification, these are the anteroseptal and midseptal right accessory pathways, while a specific subgroup includes the parahisian pathways (1.4%), which are in the vicinity of the AV conduction system.^{6,7}

In the case reported here, the temperature of 45 °C and the 35 W power of RF current achieved during the fourth RF application led to a successful ablation of accessory pathways, at the same time avoiding a complete AV block.

CONCLUSION

Radiofrequency catheter ablation therapy using low-power radiofrequency current should be considered in symptomatic patients with parahisian accessory pathways, at the same time reducing the risk of complete AV block occurrence during the procedure.

CONFLICT OF INTEREST

None declared.

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