Fasciculoventricular Preexcitation - A Case Report

Ata KIRILMAZ, MD, Fethi KILIÇASLAN, MD*, Eralp ULUSOY, MD, Kürşad ERİNÇ, MD, Ergün DEMİRALP, MD**

*Gülhane Military Medical Academy, Haydarpaşa, Kadıköy, İstanbul * Military Hospital, Dışkapı, Ankara*
*** Department of Cardiology, Gülhane Military Medical Academy, Etlik, Ankara*

Summary

Fasciculoventricular accessory pathway is a rare preexcitation and connects the His bundle to the adjacent ventricular myocardium. Although its inherent rheological and electrophysiologic properties do not cause any tachycardia, its presence as a bystander during other tachyarrhythmias may be challenging for electrophysiologists in differential diagnosis. We present a patient with an atrioventricular nodal reentrant tachycardia and a bystander fasciculoventricular accessory pathway. The slow pathway was ablated successfully and some diagnostic criteria have been proposed with the review of the related literature. Although the diagnosis of the fasciculoventricular accessory connection is relatively easy and it does not cause any tachycardia, electrophysiologists should be able to recognize the preexcitation. ***(Türk Kardiyol Dern Arş 2004; 32: 318-321)***

Key words: *Ablation, arrhythmia, fasciculoventricular preexcitation*

Özet

Fasiküloventriküler Preeksitasyon: Vaka Sunumu

Fasiküloventriküler aksesuvar yol ender bir preeksitasyon olup His demeti ile bitişik ventrikül miyokardını birbirine bağlar. Doğası ve elektrofizyolojik özellikleri nedeni ile taşikardiye neden olmasa da, diğer taşikardilere "bystander" olarak eşlik ettiğinden ayırıcı tanıda karışıklığa neden olabilir. Burada atriyoventriküler nodal "reentran" taşikardiye "bystander" olarak bulunan fasiküloventriküler aksesuvar yol sunuldu. Yavaş yol başarılı bir şekilde ablate edilirken, ilgili literatür gözden geçirilerek bazı tanısal kriterler önerildi. Fasiküloventriküler assesuvar yolun tanısı kolay ve kendisi taşikardiye neden olmasa da, elektrofizyologlar ayırıcı tanısını bilmelidirler. ***(Türk Kardiyol Dern Arş 2004; 32: 318-321)***

Anahtar kelimeler: *Ablasyon, aritmi, fasiküloventriküler preeksitasyon*

Fasciculoventricular pathways are bypass tracts connecting His bundle to the adjacent ventricular myocardium. It is a rare form of preexcitation. Since it is rare and underdiagnosed, only few cases have been published so far [1-5].

REPORT of CASE

A 21-year old man presented with frequent symptoms of palpitation lasting from a couple of minutes to a maximum of 5 minutes for the last 12 years. His physical examination was unremarkable and 12 Lead ECG at rest was depicted in Figure 1, panel A. His echocardiogram revealed no structural heart disease. He underwent an electrophysiologic study. The baseline intracardiac recordings were depicted in Figure 1, panel B. The antegrade block of the accessory pathway with an S3 from atrium revealed a non-preexcited QRS complex (Fig. 1, panel C). Catheter manipulation during electrophysiologic study induced atypical atrial flutter that terminated spontaneously (Fig. 1, panel D). A preexcited tachycardia with a cycle length of 360 ms could be reproducibly in-

Yazışma adresi: Doç.Tbp.Kd.Bnb, Ata Kırılmaz, Gülhane Military Medical Academy, Haydarpaşa, Kadıköy, İstanbul
e-mail: akirilmaz@hpasa.gata.edu.tr
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duced by programmed atrial stimulation following an AH jump of 110 ms (Fig. 2, panel A). During the tachycardia, the right ventricular premature stimulation given from the paraHisian region during the refractoriness of His bundle did not advance the atrial activation time and sequence. Slow pathway radiofrequency ablation resulted in an AV block and no inducible tachycardia (Fig. 2, panel B). The role of the preexcitation during the tachycardia and the relatively constant preexcitation pattern during different AH intervals have been explained in the discussion section.

DISCUSSION

Twelve lead ECG is remarkable for a PR interval of 100 ms and a discrete slurring of the QRS complex, supporting the preexcitation (Fig. 1, panel A). Additionally, the antegrade block of the accessory pathway following S3 from atrium revealing a non-preexcited QRS complex confirmed the presence of preexcitation (Fig. 1, panel B). Normally, one can expect that the relationship between the His deflection and the ventricular activation changes in favor of preexcitation with the maneuvers increasing the conduction time in AV Node. However, in our case, although PR interval was long (300 msn) with a premature atrial beat with a short coupling interval, HV interval was only -10 msn (Fig. 2, panel A), while it was 0 ms during sinus rhythm (Fig. 1, panel B). Mahaim fiber with anteroseptal localization may explain long PR interval in the presence of anteroseptal preexcitation, but cannot justify relatively constant HV interval. Additionally, the degree of preex-

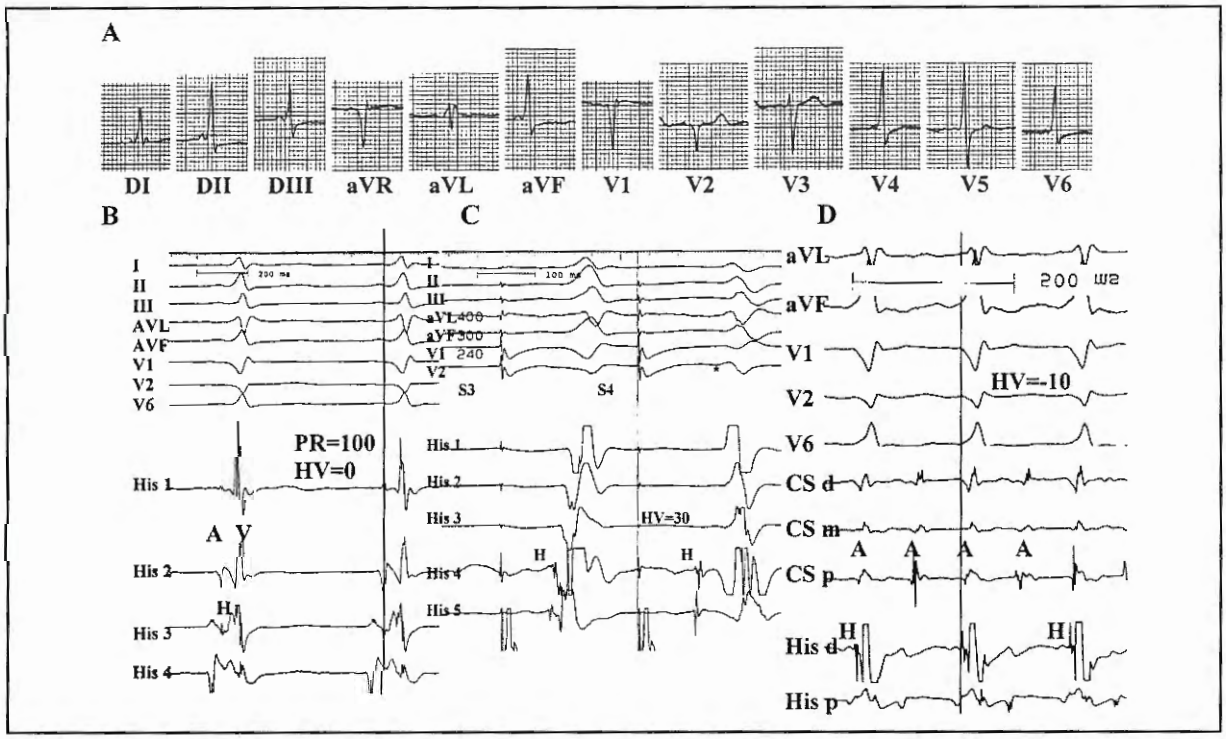

Figure 1. *Panel A. The baseline 12 Lead ECG. Panel B. Baseline intracardiac recording. Panel C. Programmed atrial stimulation from HRA (S1 400 ms, S2 300 ms, S3 240 msn). The last atrial captured beat was conducted over exclusively AV node revealing narrow QRS complex (marked with *). Panel D. During atypical atrial flutter.*

A = Local atrial activity. CS5, CS4, CS3, CS2 and CS1 = Coronary sinus leads from most proximal (5) to most distal (1). CS d, CS m, CS p = Distal, mid and proximal coronary sinus electrogram, respectively. H4, H2, H3 and H1 = His electrogram from most proximal (4) to most distal (1), respectively. His d, His p = Distal and proximal His electrogram, respectively. HRA = High right atrium, HV = HV interval, PR = PR interval. V = Local ventricular activity.

All numbers in figure are in ms.

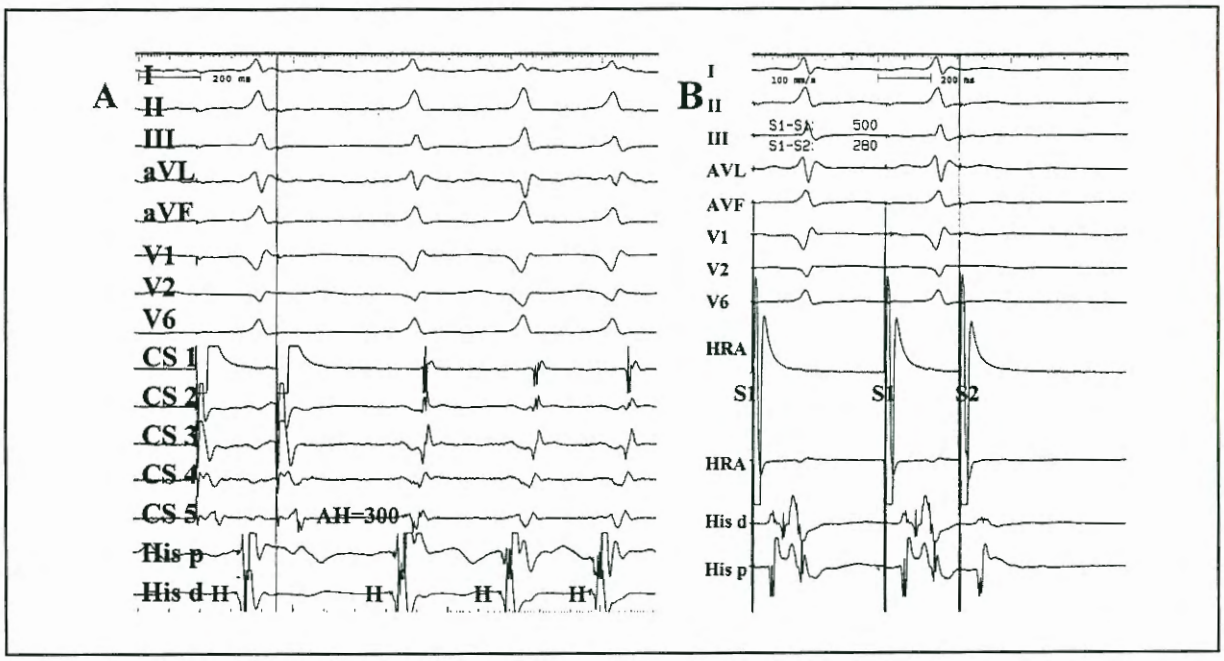

Figure 2. *Panel A. The induction of the tachycardia following programmed atrial stimulation (S1 500 ms, S2 260 ms) with an AH jump of 110 ms. Panel B. Following successful radiofrequency ablation of slow pathway, AV nodal block was demonstrated at the fast pathway refractory by programmed atrial stimulation (S1 500 ms, S2 280 ms). Abbreviations are the same as in figure 1.*

citation was not changed remarkably during atrial flutter and coarse atrial fibrillation (Fig. 1, panel D). The programmed atrial stimulation revealed the presence of the slow pathway and initiation of the tachycardia after a jump in AH interval (Fig. 2, panel A). HV interval in this recording was constant during basic stimulus, by extrastimuli or during tachycardia. The right ventricular premature stimulation given from the paraHisian region during the refractoriness of the His bundle did not advance the atrial activation time and sequence during the tachycardia thus eliminating the presence of the retrograde conduction over an accessory pathway. In the presence of an accessory pathway as in our case, this can be explained either by the absence of retrograde conduction over the accessory pathway or by refractoriness of the accessory pathway at the time of the stimulus. The latter seems to be possible because the extrastimulus given during His refractoriness coincides with the already depolarized ventricular muscle and accessory pathway, since the earliest ventricular activity is recorded from the His catheter, revealing an HV interval of 0 ms. Atrial activation sequence during tachycardia was also consistent with AV Nodal reentrant tachycardia. Following the radiofrequency ablation of the slow pathway, programmed atrial stimulation revealed an AV block at the point of jump without inducible tachycardia anymore (Fig. 2, panel B). Nevertheless, the same preexcitation pattern still persisted afterwards, although no tachycardia was induced. By improving the AV conduction by atropine, we were able to demonstrate the same AH and HV relationship. This finding confirmed that the accessory pathway was just a bystander and did not cause any tachycardia. In addition, Figure 2, panel B supports that the accessory pathway depends on AV node, since there was no preexcitation following the atrial premature beat that was blocked at the AV node after slow pathway ablation.

The presence of the following criteria: [1] short PR interval; [2] discrete slurring of QRS com-

plex indicating preexcitation suggestive of septal localization; [3] relatively fixed HV interval (change not more than 20 ms) under conditions prolonging AH interval; [4] AV node dependency for the presence of preexcitation; [5] not causing any tachycardia; and [6] a short AH interval at baseline; enabled us to come up with the diagnosis of fasciculoventricular (between His and adjacent ventricular tissue) accessory pathway. No application of radiofrequency energy was delivered for the accessory pathway based on its inherent rheological and electrophysiologic properties, which do not cause any tachycardia.

The patient remained free of symptoms during follow-up.

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