

## Successful catheter ablation of accessory pathway from noncoronary cusp of aorta: an alternative approach

### Aksesuvar yolun nonkoroner aort yaprakçığından başarılı kateter ablasyonu: Alternatif bir yaklaşım

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**Summary**– Anteroseptal accessory pathways are relatively rare. Because of the close proximity of the atrioventricular (AV) node, ablation of these accessory pathways has the potential to result in AV block. The anteroseptal region is adjacent to the noncoronary cusp, allowing anteroseptal accessory pathways to be ablated from the noncoronary cusp. A 34 year-old male patient with recurrent episodes of palpitation for approximately ten years was admitted to our department. Twelve lead-ECG was consistent with anteroseptal accessory pathway. Intracardiac recordings were also consistent with anteroseptal accessory pathway. In this case, we found an excellent AV relation while mapping the noncoronary cusp. Radiofrequency (RF) ablation was applied to this region. Pre-excitation was immediately disappeared during RF application. After RF ablation, there was no pre-excitation detectable by ECG. In this report, we present a case of anteroseptal accessory pathway that was successfully ablated from the noncoronary cusp.

Anteroseptal accessory pathways are relatively rare. Because of their close proximity to the atrioventricular (AV) node, ablation of these accessory pathways has the potential to result in AV block. The anteroseptal region is adjacent to the noncoronary cusp. Thus, it is possible to ablate anteroseptal pathways from the noncoronary cusp.

In this report, we present a case of an anteroseptal accessory pathway that was successfully ablated from the noncoronary cusp.

#### CASE REPORT

A 34-year-old male patient with recurrent episodes of palpitation for approximately ten years was admitted

**Özet**– Anteroseptal yerleşimli aksesuvar yollar göreceli olarak nadirdir. Bu aksesuvar yolların ablasyonunda atriyoventriküler (AV) noda yakın komşulukları nedeni ile AV blok riski vardır. Anteroseptal bölgenin nonkoroner yaprakçık ile komşu olması, anteroseptal aksesuvar yolların nonkoroner kuspisten ablasyonuna olanak sağlar. Yaklaşık 10 yıldır tekrarlayan çarpıntı nöbetleri olan 34 yaşındaki erkek hasta kliniğimize başvurdu. On iki derivasyonlu elektrokardiyografisi (EKG) anteroseptal aksesuvar yol ile uyumlu idi. Aynı zamanda intrakardiyak kayıtlar da anteroseptal aksesuvar yolu düşündürmekteydi. Olguda yapılan haritalama işleminde en iyi AV ilişkisi nonkoroner yaprakçık bölgesinde bulundu. Bu bölgeye radyofrekans (RF) ablasyonu uygulandı. RF ablasyonu esnasında preeksitasyon hemen kayboldu. RF uygulaması sonrası EKG’de preeksitasyon yoktu. Bu yazıda, nonkoroner yaprakçıktan başarılı RF ablasyon uygulanan anteroseptal yerleşimli aksesuvar yolu bulunan olgu sunuldu.

to our department. Physical examination, stress electrocardiography (ECG), and echocardiographic evaluation were normal. Resting ECG was consistent with an anteroseptal accessory pathway. An electrophysiological study completed one year prior confirmed the presence of an anteroseptal accessory pathway. However, radiofrequency (RF) ablation had not been applied because of the high AV block risk. Despite medical treatment, the patients’ complaints had increased over the last one-year. The patient accepted the potential risk of AV block and elected to undergo RF ablation. A repeat electrophysiological study was performed.

#### Abbreviations:

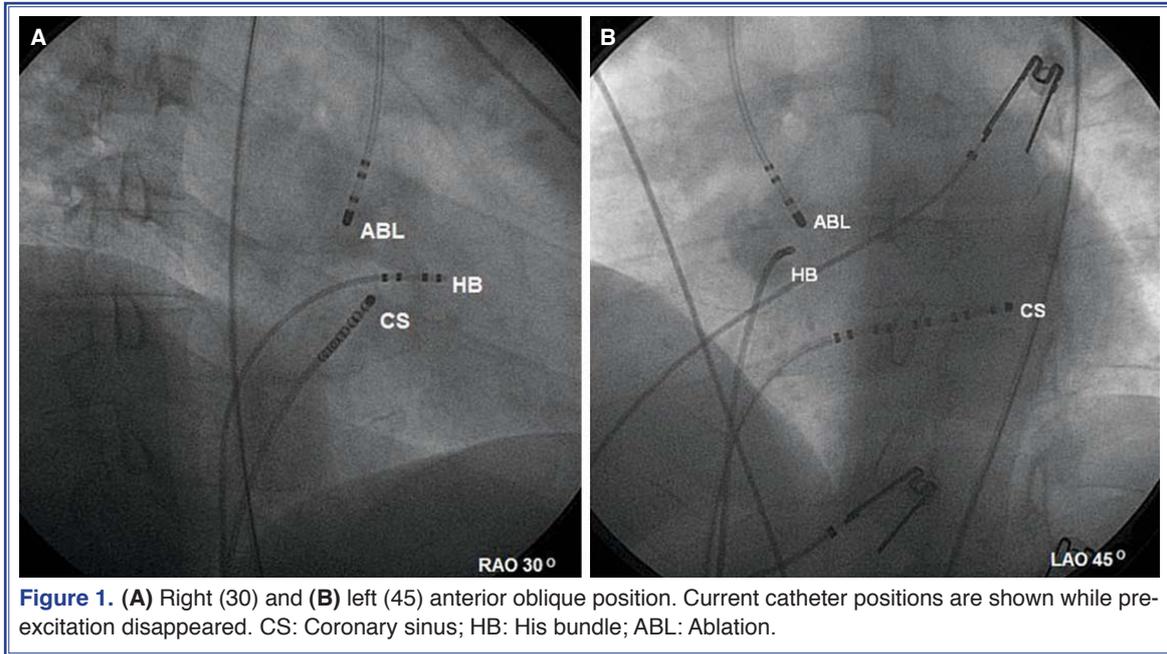
AV	Atrioventricular
AVRT	AV re-entrant tachycardia
ECG	Electrocardiography
RF	Radiofrequency

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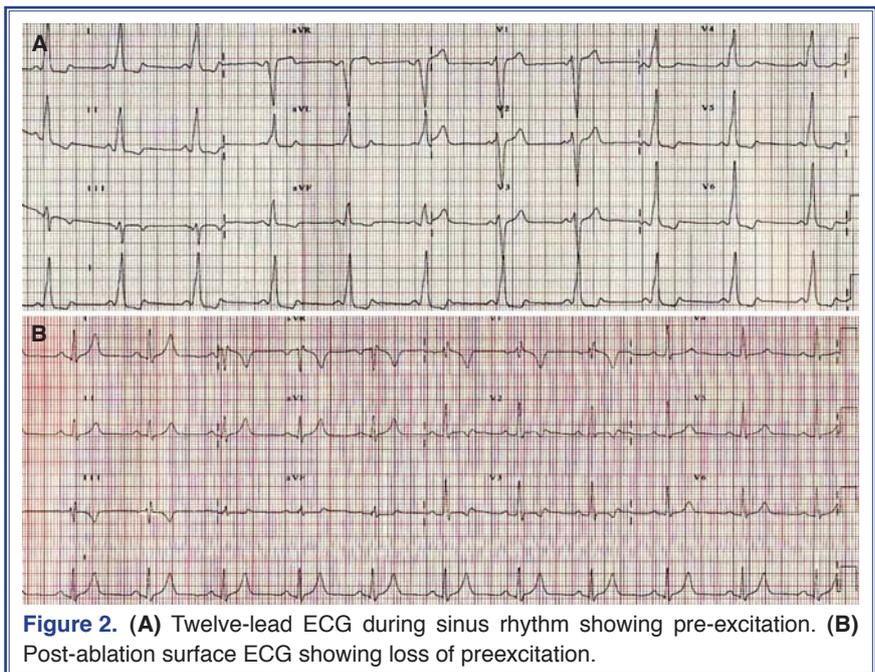
**Figure 1.** (A) Right (30) and (B) left (45) anterior oblique position. Current catheter positions are shown while pre-excitation disappeared. CS: Coronary sinus; HB: His bundle; ABL: Ablation.

Diagnostic and coronary sinus catheters were inserted via the femoral vein to the His and the coronary sinus, respectively. Intracardiac recordings were consistent with an anteroseptal accessory pathway. AV re-entrant tachycardia (AVRT) was induced by programmed atrial stimulation. Mapping of the anteroseptal region was performed during AVRT or during sinus rhythm (during maximal pre-excitation by atrial pacing). The accessory pathway was found to be located very close to the His bundle region and the AV node. Due to the risk of AV block, cryoablation was preferred to RF ablation. Cryoablation catheter was advanced to the accessory pathway site. Cryoablation was performed at sites where cryomapping showed no AV block. Despite several applications, pre-excitation did not disappear. Subsequently, we switched to RF ablation and performed RF ablation at sites that cryomapping indicated as safe. However, RF ablation was ceased when the patient suffered a transient AV block. Therefore, we decided to ablate the accessory pathway from the aortic cusp region. Aortic cusp region was reached via femoral artery and mapping of the noncoronary cusp was performed. RF ablation

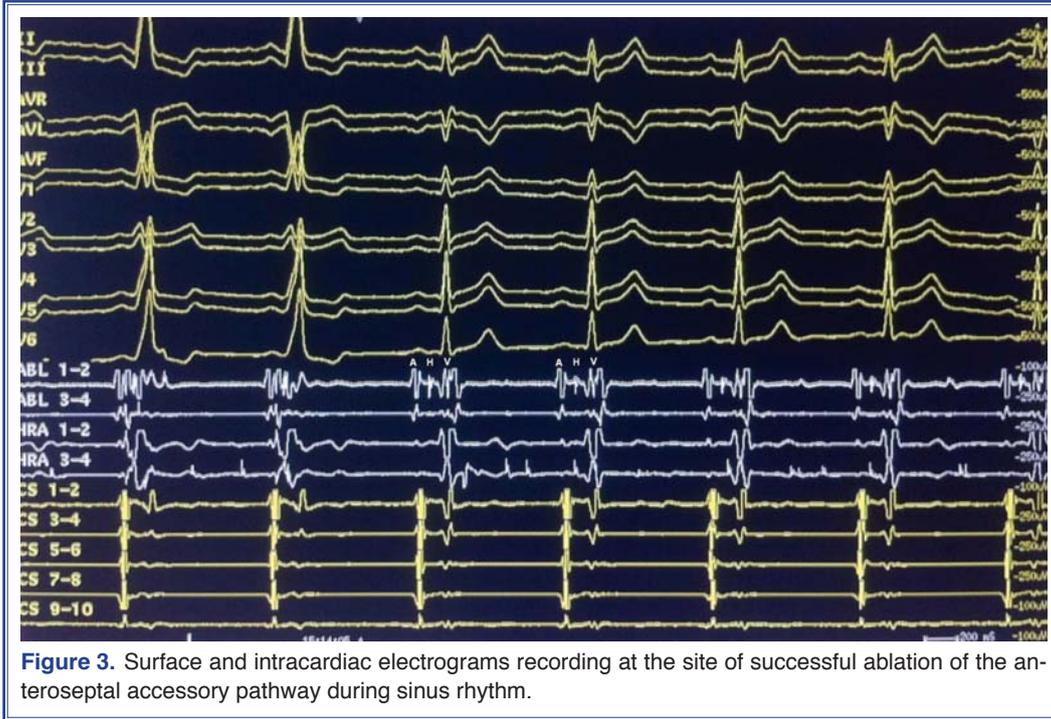
(30 watt, 55°C) was applied to the appropriate AV connection site (Fig. 1). Pre-excitation was immediately eliminated during RF application. After RF ablation, there was no pre-excitation and VA conduction was decremented during V pace (Fig. 2).

**DISCUSSION**

Radiofrequency ablation is the treatment of choice in symptomatic patients with accessory pathways.<sup>[1]</sup>



**Figure 2.** (A) Twelve-lead ECG during sinus rhythm showing pre-excitation. (B) Post-ablation surface ECG showing loss of preexcitation.



**Figure 3.** Surface and intracardiac electrograms recording at the site of successful ablation of the antero-septal accessory pathway during sinus rhythm.

However, RF ablation of accessory pathways is difficult due to the close proximity to the His bundle and the AV node. Cryoablation may be preferred to RF ablation in these patients in order to decrease the risk of AV block. Nevertheless, failed cryoablation or recurrence after cryoablation has been reported.<sup>[2]</sup> The aortic noncoronary cusp is an alternative access point, especially for the accessory pathways that cannot be ablated from right atrium.<sup>[3]</sup> Antero-septal accessory pathways may be located at the anterior membranous septum or may have an epicardial localization. In our case, we found a very good AV relation while mapping in the noncoronary cusp. After ablation of this site, pre-excitation disappeared. After RF application from the distal tip, the RF ablation catheter showed His bundle potential (Fig. 3). In aortic cusp ablations, it has been suggested that RF ablation should be avoided at sites where His potential is recorded. In our case, RF ablation was attempted at additional secure sites at which His bundle potential was not recorded. In addition, cryoablation was performed repeatedly. However, sustained success could not be achieved. Therefore, RF was applied to sites with His potential to avoid AV block at the successful ablation site in the non-coronary cusp. We gradually increased the heat and energy and avoided contact with the His catheter. The accessory pathway was successfully ab-

lated by this alternative approach from the epicardial site. Fortunately, there was no AV block despite His bundle recording on the RF ablation catheter. Aortic cusp ablations included the risk of aortic cusp rupture, aortic valve damage, and coronary artery occlusion. It has been suggested that coronary ostiums should be at least 1 cm away from the ablation site during aortic cusp ablation. Also, temperature should be below 55°C during ablation.<sup>[4]</sup>

A limited number of successful antero-septal accessory pathway ablations in the non-coronary cusp and left coronary cusp have been reported in the literature.<sup>[1,3,4]</sup> Aortic cusps should be considered as an alternative ablation site when endocardial ablation of antero-septal accessory pathways fails. In these patients, ablation should be done very carefully because of the proximity to the coronary artery ostium and the risk of aortic cusp perforation. In conclusion, successful RF ablation of antero-septal accessory pathways in the noncoronary cusp is possible.

**Conflict-of-interest issues regarding the authorship or article:** None declared

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**Key words:** Accessory pathway; catheter ablation; noncoronary cusp.

**Anahtar sözcükler:** Aksesuar yol; kateter ablasyonu; nonkoroner yaprakçık.