

Successful percutaneous epicardial ablation of an accessory pathway located at the right atrial appendage

Sağ atriyal apandis yerleşimli aksesuar yolun başarılı perkütan epikardiyal ablasyonu

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Summary – In patients with Wolff-Parkinson-White syndrome, difficulty in ablation of accessory pathways is associated with failures and recurrences. Epicardially located accessory pathways may require different management strategies when conventional ablation attempts fail. In particular, an epicardial accessory pathway communicating the right atrial appendage to the right ventricle is an extraordinary situation resulting in difficulties in ablation. Hereby, we report on a challenging case of percutaneous epicardial ablation of an epicardial accessory pathway located at right atrial appendage in a 28-year-old man with Wolff-Parkinson-White syndrome, who had a prior history of unsuccessful endocardial ablation. Percutaneous epicardial ablation may be a viable option obviating the necessity of surgical ablation procedures for difficult ablation cases with epicardial accessory pathways.

Özet – Wolff-Parkinson-White sendromu olan hastalarda aksesuar yolun ablasyonundaki zorluklar işlem başarısızlığı ve nökslerle sonuçlanır. Epikardiyal yerleşimli aksesuar yollar, konvansiyonel ablasyon denemeleri başarısız kaldığında farklı tedavi stratejileri gerektiren önemli bir sorundur. Özellikle, sağ atriyal apandis ile sağ ventrikülü bağlayan epikardiyal yerleşimli aksesuar yol varlığı ablasyonu zorlaştıran sıradışı durumlardan biridir. Bu yazıda, daha önceden başarısız endokardiyal ablasyon öyküsü olan Wolff-Parkinson-White sendromlu, 28 yaşında bir erkek hastada, sağ atriyal apandis yerleşimli epikardiyal aksesuar yolun perkütan epikardiyal ablasyonu sunuldu. Perkütan epikardiyal ablasyon yöntemi, epikardiyal aksesuar yolun ablasyonunun zor olduğu olgularda cerrahi ablasyon işlem gerekliliğini ortadan kaldıracak önemli bir tedavi seçeneği olabilir.

Abbreviations:

PEA Percutaneous epicardial ablation
WPW Wolff-Parkinson-White

In patients with Wolff-Parkinson-White syndrome, difficulty in ablation of accessory pathways is associated with failures and recurrences. From this perspective, epicardially located accessory pathways may require different management strategies when conventional ablation attempts fail. Existence of an epicardial accessory pathway communicating the right atrial appendage to the right ventricle is an extraordinary situation resulting in difficulties in ablation.

Hereby, we report on a challenging case regarding ablation of an epicardial accessory pathway located at the right atrial appendage in a patient with WPW

syndrome, who had a prior history of unsuccessful endocardial ablation.

CASE REPORT

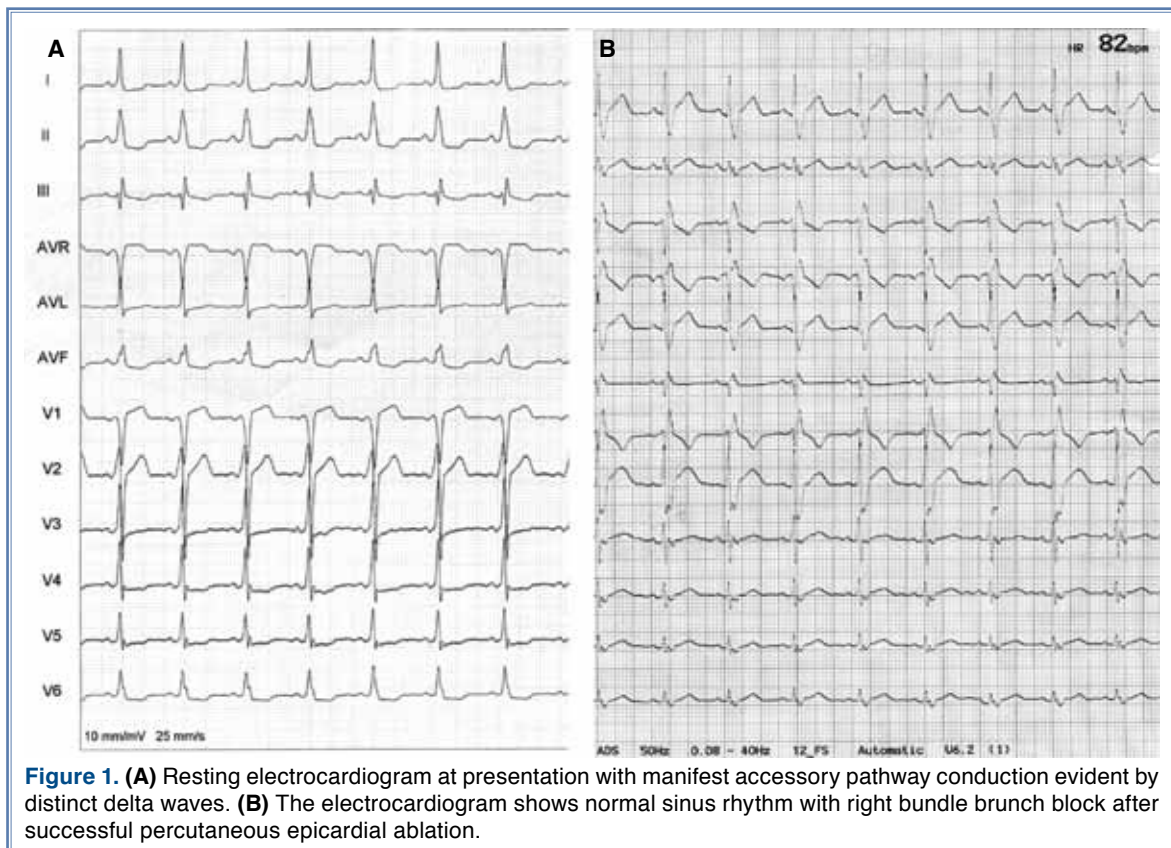
A 28-year-old man suffering from palpitations and emergency visits due to recurrent documented supraventricular tachycardia episodes was admitted to our department for electrophysiological evaluation. He had a prior unsuccessful endocardial ablation attempt elsewhere with an electrophysiological diagnosis of parahisian accessory pathway. His physical examination was normal and he was free of any structural heart disease as confirmed by echocardiography. Resting surface electrocardiogram showed a manifest

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preexcitation pattern (Fig. 1a). We performed a conventional electrophysiological study during which an orthodromic atrioventricular reentrant tachycardia with right bundle branch block was induced (Fig. 2) during programmed electrical stimulation. The right atrial appendage was determined as the site of the earliest ventricular activation, but endocardial ablation attempts at the anterior and anterolateral tricuspid annulus and atrial appendage were unsuccessful. Therefore, we decided to switch to percutaneous epicardial ablation in the same session. The details of this method was published previously.^[1] The procedure was carried out under conscious anesthesia. In brief, we performed the pericardial access via a subxiphoid approach utilizing a 12-mm, 18 G Tuohy needle (Braun, Melsungen, Germany) under fluoroscopic guidance. Then, a 9 Fr sheath was placed to the pericardial space over the guide wire. Epicardial mapping confirmed the right atrial appendage as the site of the earliest ventricular activation. Thereafter, selective coronary angiography was performed to define the proximity of coronary arteries in relation to the ablation target and ensure secure delivery of radiofrequency energy. Application of radiofrequency energy (30 watts at 50°) by an irrigated ablation catheter (NaviStar ThermoCool, Biosense

Webster, Diamond Bar, CA, USA) successfully eliminated the accessory pathway conduction at the epicardial surface of the right atrial appendage (Fig. 3). Subsequent attempts to induce tachycardia through atrial and ventricular programmed electrical stimulation confirmed that the accessory pathway conduction was absent and orthodromic tachycardia was no longer inducible. The whole procedure was completed in 2.5 hours (including endocardial ablation attempt) without any complication. The resting electrocardiogram (Fig. 1b) and echocardiographic examination of the patient were normal, so he was discharged the following day. At three-month follow-up, he was still asymptomatic without any evidence for recurrence.

DISCUSSION

Supraventricular tachycardia substrates should not necessarily be endocardial. Supraventricular tachycardias may sometimes originate from epicardial substrates and endocardial ablation of these target structures may be challenging.^[2] In case of WPW syndrome, difficulty in ablation of accessory pathways accounts for about 1-5% of failure and requires specialized attention and methods for successful reintervention.^[3] Although in-

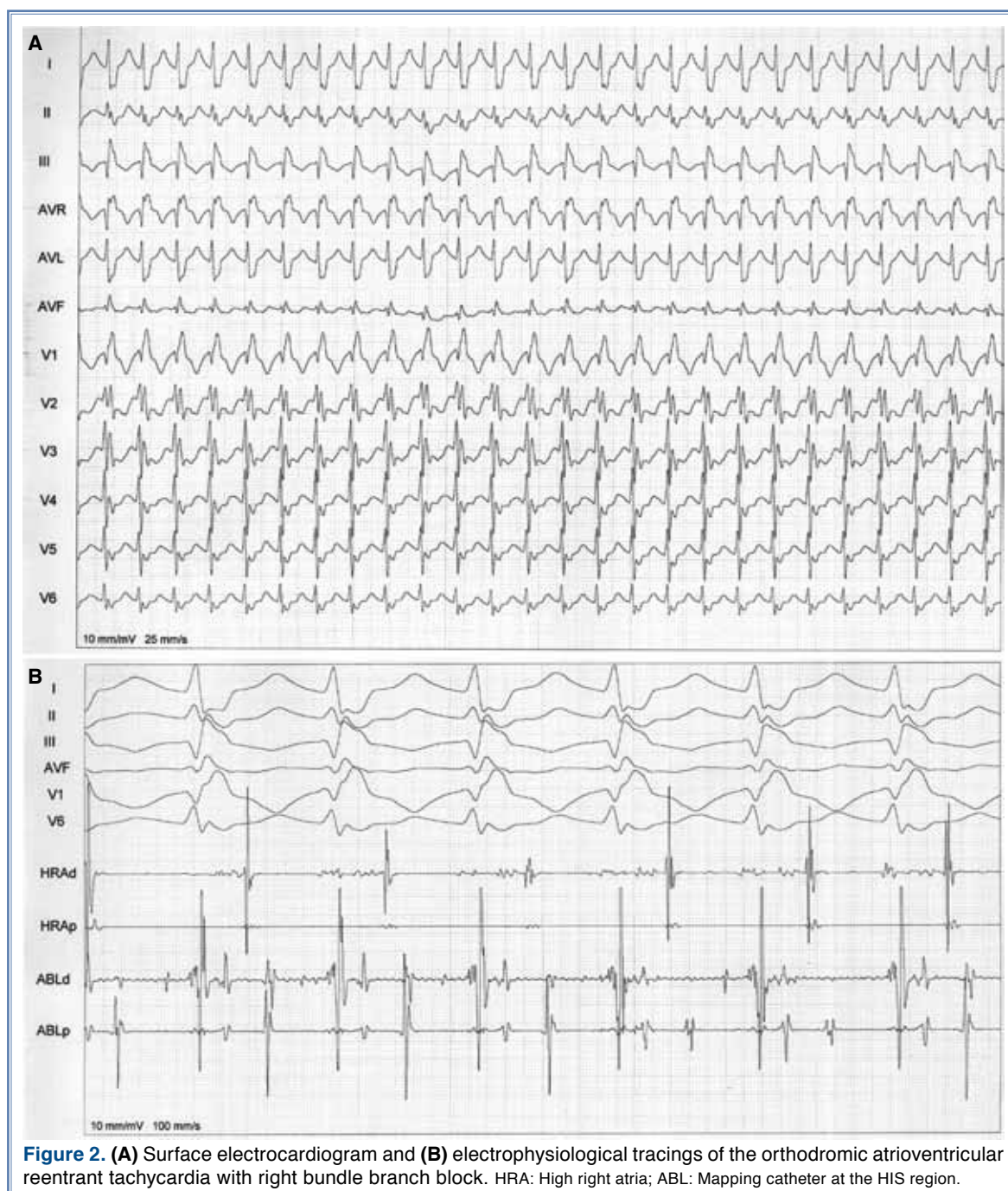
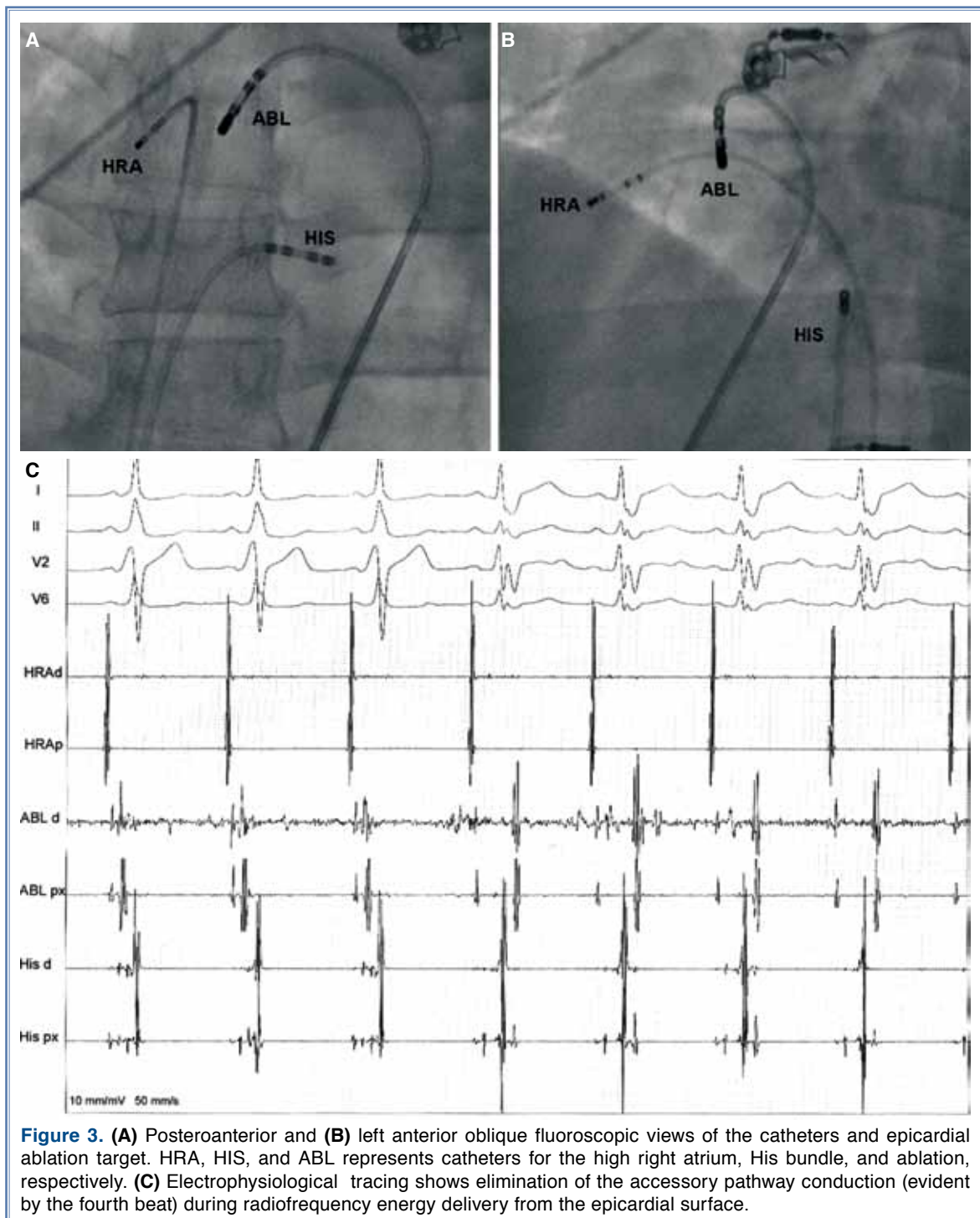


Figure 2. (A) Surface electrocardiogram and (B) electrophysiological tracings of the orthodromic atrioventricular reentrant tachycardia with right bundle branch block. HRA: High right atria; ABL: Mapping catheter at the HIS region.

accurate mapping and inadequate catheter manipulation to reach the target site remain as the two major causes, existence of multiple pathways, a thick accessory band, or an unusual or epicardial accessory pathway may be the underlying reason of failed ablations for WPW syndrome.^[3,4] This case represents two of the above-mentioned reasons: (i) Inaccurate mapping was responsible for the failed ablation procedure performed elsewhere. We believe that misidentification of the ac-

cessory pathway location and prior futile endocardial ablation attempts at the parahisian region resulted in failure and inadvertent right bundle branch injury; the latter might be responsible for the right bundle branch block that emerged during orthodromic atrioventricular reentrant tachycardia and persisted after elimination of accessory pathway conduction. Although misdiagnosis was evident from the epicrisis for the prior ablation, our comment on the right bundle branch in-



jury is somewhat speculative because previous electrophysiological study details, tracings related to induced tachycardia, and radiofrequency energy delivery data were not available to us. (ii) As confirmed by epicardial mapping, an extraordinary accessory pathway located epicardially at the right atrial appendage was the reason of failure in our endocardial ablation attempt.

Utilizing a transeptal approach and delivery of radiofrequency energy through the coronary sinus are established options to be tried in challenging cases having left-sided accessory pathways. Indeed, right-sided accessory pathway ablations can be facilitated by utilizing long sheaths that provide extra support for catheter stability or by mapping the right coronary

artery with special wires to obtain precise accessory pathway location. On the other hand, a new method involving percutaneous epicardial instrumentation has become a promising alternative especially for tachycardias originating from epicardial substrates. Initially PEA strategy was developed for mapping and ablation of ventricular tachycardias particularly related with a myocardial scar or Chagas disease after failed ablation attempts.^[5,6] Despite limited experience with supraventricular tachycardias, PEA strategy involving epicardial catheter-based mapping and ablation of a variety of supraventricular tachycardias is feasible, safe, and effective.^[7] This method not only serves as an ablation option but, when combined with endocardial approach, it also guides identification of the ideal target locations for endocardial ablation.^[5,6,8] Therefore, it complements conventional endocardial ablation method in case ablations for WPW syndrome fail.

Epicardial accessory pathways are most commonly found at the posteroseptal or left posterior regions which can be assessed via the coronary sinus if endocardial ablation fails. However, an epicardial accessory pathway communicating the atrial appendage to the right ventricle is relatively an exceptional situation. The atrial appendage is a difficult target for ablation due to limited blood flow between the catheter and the trabeculated surface of the appendage, and use of irrigated catheters or an epicardial approach may be necessary to achieve successful ablation. Lam et al.^[9] were the first to report a successful ablation of an epicardial right atrial appendage pathway by the PEA method. As far as we know, after three more cases treated with PEA,^[6] this report presents the fifth original case underlining the fact that PEA (before moving on to surgical epicardial ablation) is an effective and safe option for patients with WPW syndrome associated with an epicardial accessory pathway, in whom prior conventional ablation attempts have failed.

Successful percutaneous epicardial ablation of an epicardial accessory pathway located at the right atrial appendage is amongst the few reported cases worldwide. Therefore, this paper provides further evidence for utility of an epicardial ablation strategy for patients with WPW syndrome when conventional endocardial ablation procedures fail to eliminate the accessory pathway conduction. Nonetheless, considering the importance of correct diagnosis and appropriate mapping in failed cases, repeat application of conventional

electrophysiological study and endocardial mapping by an experienced operator in an experienced center should still be a prerequisite to attempt PEA, as it was in our case.

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

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Key words: Atrial appendage; catheter ablation/methods; heart conduction system; tachycardia, supraventricular; treatment failure; Wolff-Parkinson-White Syndrome.

Anahtar sözcükler: Atriyal apandis; kateter ablasyonu/yöntem; kalp iletim sistemi; taşikardi, supraventriküler; tedavi başarısızlığı; Wolff-Parkinson-White sendromu.