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Adenosine-induced persistent recovery of accessory pathway conduction following mechanical block

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A 27-year-old male with supraventricular tachycardia (SVT) was referred for redo accessory pathway (AP) catheter ablation. Three-month before, he underwent electrophysiological study that demonstrated the presence of a concealed right posteroseptal AP and easily inducible orthodromic reciprocating tachycardia. At this time, radiofrequency (RF) ablation was attempted at the coronary sinus ostium and abolished retrograde AP conduction after 5 s of RF application. A few weeks later, he presented with SVT recurrence and underwent a redo procedure. Pathway-mediated ventriculo-atrial (VA) conduction and atrioventricular reentrant tachycardia was again demonstrated. Mapping during ventricular pacing confirmed the recurrence of the right posteroseptal AP. Mechanical "bump" of the AP occurred during manipulation of the ablation catheter in the coronary sinus ostium area, resulting in complete loss of VA conduction. After 30 min of observation with persistent VA dissociation (Fig. 1, Panel A, left), intravenous administration of 12 mg of adenosine provided immediate and persistent recovery of AP-mediated VA conduction (Panel A, red arrow indicates recovery of AP conduction following adenosine administration), allowing mapping and AP localization. The AP was successfully ablated at the anterior portion of the coronary sinus ostium using an irrigated RF catheter during ventricular pacing with VA dissociation occurring after 3.5 s of application (Panel B, local electrograms at the site of RF delivery; red asterisk indicates time of AP elimination leading to VA dissociation). VA dissociation was maintained upon further adenosine administration.

Recovery of AP conduction induced by adenosine following radiofrequency application is a well-known phenomenon referred as AP dormant conduction [1]. Involved mechanisms include unmasking of slow AP conduction by adenosine-induced atrioventricular node block and recovery of AP excitability through resting membrane hyperpolarization of partially injured cardiac tissue [1]. In our case, the absence of nodal VA conduction makes the latter mechanism the most likely. Previous radiofrequency ablation may have accounted for AP susceptibility to mechanical "bump" and response to adenosine-induced membrane hyperpolarization. This mechanism is comparable to adenosine-induced recovery of pulmonary vein conduction following radiofrequency isolation, whom further elimination improves long-term freedom from atrial fibrillation recurrence [2]. Similarly, adenosine-induced transient AP conduction recovery has been associated with higher rates of SVT recurrence requiring redo ablation [1]. Adenosine-induced transient recovery of AP conduction following mechanical trauma or radiofrequency ablation, requiring repeated administration of adenosine boluses have already been reported [3–5]. Our case is to our knowledge the first to report a persistent recovery, allowing for further mapping and ablation, similar to what is observed in pulmonary vein dormant conduction. A coincidence between adenosine administration and a spontaneous AP conduction recovery cannot be totally ruled out but seems unlikely as VA dissociation persisted for 30 min before adenosine administration. The persistent nature of the AP conduction recovery prevented us to assess the reproducibility of the phenomenon. Besides its interest to identify patients at risk for recurrence in case of transient AP conduction recovery, this case illustrates that adenosine administration may also be a useful tool to ensure successful ablation when a mechanical block occurs during the procedure.

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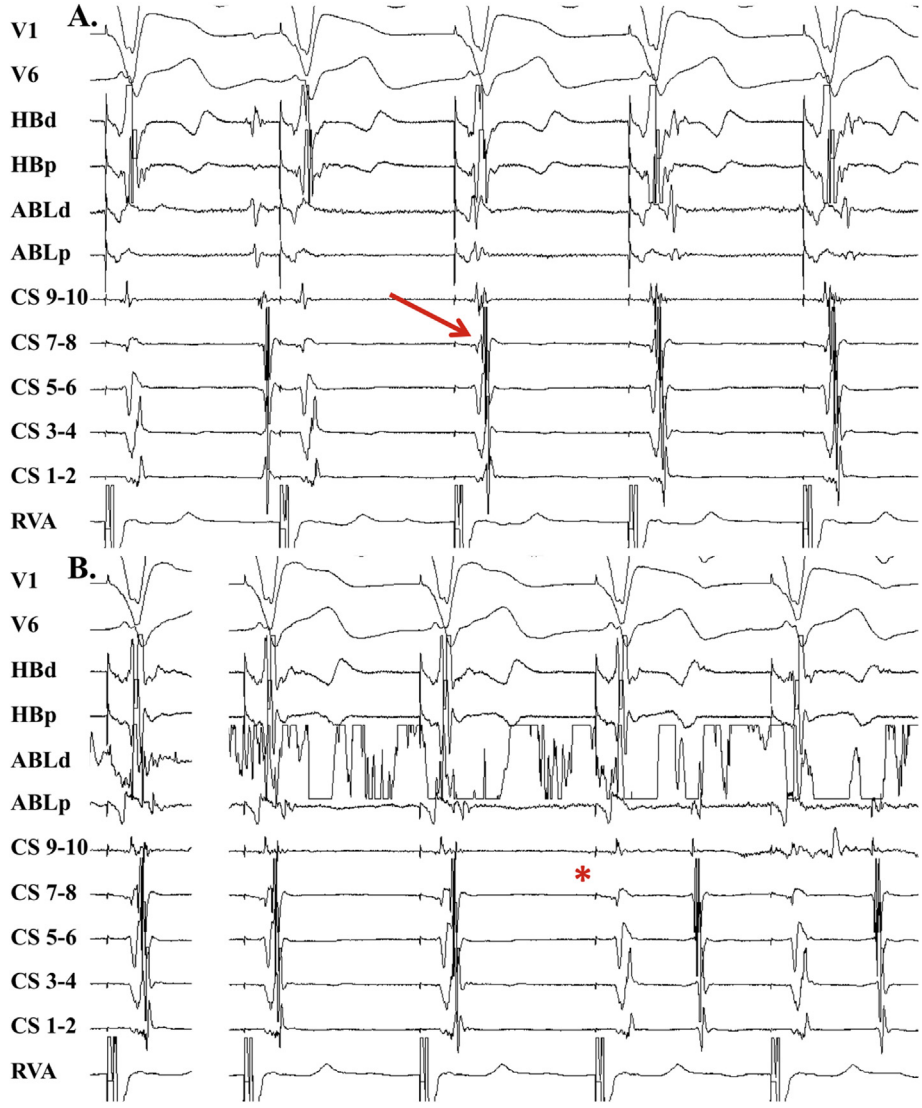

Fig. 1. A. Ventriculo-atrial (VA) dissociation during right ventricular pacing following accessory pathway (AP) mechanical block. Bolus administration of 12 mg of adenosine resumed AP-mediated VA conduction (red arrow). **B.** The persistent nature of adenosine-induced recovery of AP-mediated VA conduction allowed AP successful mapping (left) and radiofrequency ablation (right), leading to VA dissociation occurring after 3.5 s of application.

Disclosures

The authors report that they have no relationships relevant to the contents of this paper to disclose.

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