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Recurrent accessory pathway conduction in a patient with Wolff-Parkinson-White syndrome: How to ablate?

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Synopsis

We report a case of a malignant right free wall AP that showed very rapid conduction during atrial fibrillation. The accessory pathway was attached to from the right atrial appendage to the right ventricle. Catheter ablation from an endocardial approach was met with limited success.

Epicardial mapping of the atrial insertion site was achieved via a subxiphoid pericardial puncture.

Long-term success was noted after ablation was performed in the epicardial space at the site of the tightest VA interval.

Keywords

catheter ablation; Wolff-Parkinson-White syndrome; supraventricular tachycardia

Clinical Presentation

A 24 year-old man presented to the emergency department with sudden onset, sustained palpitations. His medical history was notable for intermittent palpitations beginning several months prior to presentation, lasting a few seconds to minutes at a time. ECG demonstrated preexcited atrial fibrillation (AF) with an average ventricular rate of 208 bpm (Fig. 1), ultimately causing hemodynamic instability and requiring defibrillation to sinus rhythm. The ventricular preexcitation pattern was suggestive of a right-sided accessory pathway (AP) (Fig. 2). On admission, physical examination, chest radiograph, and laboratory evaluation were unremarkable. Transthoracic echocardiography revealed no significant structural abnormalities and preserved left and right ventricular systolic function. He was referred for electrophysiology study (EPS).

During EPS, the pattern of activation during sinus rhythm and ventricular pacing was consistent with a right anterolateral AP, and orthodromic AV re-entry tachycardia was induced. During induced atrial fibrillation, the shortest RR interval was 210 msec.

Radiofrequency (RF) ablation at multiple sites of early ventricular activation at 10 o'clock

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on the tricuspid annulus failed to eliminate preexcitation. A site with short local VA time during ventricular pacing was found at the base of the right atrial appendage (RAA), and an 8mm tip catheter was used to ablate at this site, with loss of preexcitation (Fig 3).

The patient returned four weeks later with palpitations and was found to have recurrence of preexcitation by ECG. EPS was performed, and a 3.5mm open-tip irrigated catheter (Biosense Webster Navistar ThermoCool) was used to perform repeat ablation of the atrial insertion of the AP at the base of the RAA. Approximately 24 hours after the ablation, however, preexcitation recurred.

Question: What should be the next ablation strategy?

The patient returned for a repeat EPS using an epicardial approach. Epicardial access was obtained via a subxyphoid approach under fluoroscopic guidance with injection of contrast to visualize entry into the pericardial space [4]. A deflectable 4mm ablation catheter (Biosense Webster Navistar) was advanced through an 8F sheath into the pericardial space. Coronary angiography was performed to localize the right coronary artery. During ventricular pacing, a site with short local VA time was identified adjacent to the prior endocardial ablation site at the base of the RAA. Ablation at this site in sinus rhythm (30 Watts) resulted in sustained loss of preexcitation. Fluoroscopic catheter positions are shown in Figure 4. Post-ablation, the patient remained asymptomatic with no evidence of preexcitation on ECG after 24 months of follow-up.

Discussion

RF ablation is a first line therapy for AP mediated tachycardias. Variant APs arising from RAA, treated with endocardial or surgical ablation, have been previously reported [1-3]. Ablation of APs from the tricuspid or mitral annulus or in a branch of the coronary sinus has been associated with success rates greater than 90 percent [5-6]. In cases of prolonged or failed AP ablation, an epicardial approach was used in 8 to 18 percent of cases, including the right atrial free wall [7-8]. Epicardial ablation of RAA to right ventricle APs have been reported previously [9-10]. For APs that originate from the RAA, this case illustrates that successful ablation may be performed far from the annulus at the atrial insertion site. A lack of AP potential in the annulus may indicate the need to explore elsewhere in the right atrium [9]. In this case, the short VA time during ventricular pacing allowed identification of a successful site for epicardial ablation.

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Figure 1.
Preexcited atrial fibrillation.

Figure 2.
Sinus rhythm with ventricular preexcitation pattern suggestive of right-sided accessory pathway.

Figure 3. Intracardiac electrogram in sinus rhythm during successful ablation (arrow) showing surface ECG, ablator (ABL), bundle of His (HIS), coronary sinus (CS) and right ventricular (RV) recordings.

Figure 4.

Fluoroscopic catheter positioning in RAO and LAO projections. Ablator is epicardial (Epi) and a second mapping catheter sits at the prior successful endocardial ablation site (Endo). A diagnostic coronary catheter is positioned in the right coronary artery.