

Successful left-sided accessory pathway ablation without reference catheter in patient with atresia of coronary sinus and thin persistent left superior vena cava^{*}

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Received 7 September 2013; revised 1 October 2013; accepted 29 October 2013

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ABSTRACT

We report a case of atrioventricular reentrant tachycardia (AVRT) with ostial atresia of the coronary sinus (CS). Without the anatomic angiography, radiofrequency (RF) energy was applied at the mitral valve annulus and the bypass tract was eliminated. After the therapy procedure, by CS angiography, we knew the persistent left superior vena cava (PLSVC), and the coronary sinus was connected with vena cava superior, very thin in a diameter. The therapy procedure was successful. The patient has remained completely symptom free.

Keywords: Ablation; Accessory Pathway; Atresia of the Coronary Sinus

1. INTRODUCTION

Coronary sinus (CS) atresia is a rare cardiac anatomic variant which causes failure to cannulate CS and considerable challenges in affecting cure. CS ostial atresia was associated with a few persistent left superior vena cava (PLSVC), an unroofed coronary sinus, or was a postoperative complication [1-5]. Patients with CS ostial atresia have been reported to have atrioventricular reentrant tachycardia [3-5], atrial flutter [4], and atrioventricular nodal reentrant tachycardia [6].

We report a case of CS ostial atresia with anomalous venous drainage into PLSVC with a left-sided accessory pathway (AP) that was successfully eliminated by catheter ablation.

^{*}Conflict of Interest: None.

2. CASE REPORT

A 57-year-old man with recurrent paroxysmal supraventricular tachycardia (PSVT) effective to propafenone was referred to our hospital for a cardiac electrophysiological study (EPS) and ablation one month ago. A 12-lead electrocardiogram (ECG) done during sinus rhythm exhibited no delta waves. A 12-lead ECG done during the palpitation revealed a regular, narrow QRS tachycardia at a rate of 170 bpm with P'-waves in leads II and aVF, QRS-P' interval was 86ms; this suggested that the patient had an atrioventricular reentrant tachycardia (AVRT) through a concealed accessory pathway (AP). The physical examination, chest x-ray, echocardiograms and serological examinations were normal. After written informed consent was obtained from the patient, EPS was done after the withdrawal of all antiarrhythmic drugs for five elimination half-lives.

One quadripolar electrode catheter was cannulated from Vena cava inferior, positioned in the right ventricular apex. One multipolar electrode catheter was cannulated from Subclavian Vein. Attempts to cannulate the coronary sinus (CS) were unsuccessful. Without CS angiography, we set a proximal electrode of multipolar catheter on the ostial of CS.

Baseline intervals during sinus were as follows: sinus cycle length 660 ms, atrial His (AH) interval 79 ms, and His-ventricular (HV) interval 64 ms. There was no ventricular preexcitation during sinus rhythm and decremental ventricular pacing down to 350 ms. A regular, narrow QRS tachycardia with a cycle length of 350 ms was repeatedly induced. During tachycardia, proximal multipolar electrode was revealed V-A interval 86 ms, middle electrode was revealed V-A interval 145 ms, distal

electrode couldn't recorded ventricular potential. Ventricular-atrial transmits are at the same rhythm. This suggested the tachycardia was orthodromic atrioventricular reentrant tachycardia (OAVRT) with a concealed left-sided AP.

Mapping of the mitral valve annulus was performed during ventricular pacing, using a Medtronic ablation catheter with a 4-mm distal tip that was inserted from the right femoral artery. The earliest activated point on atrial side was recorded in the 3 o'clock region of the mitral annulus. Radiofrequency (RF) energy, delivered to this site for 240 seconds at a temperature of 60°C, eliminated the bypass tract. Fifteen minutes after the delivery of the RF energy, there was persistent ventricularatrial (VA) dissociation. At present, the patient had remained completely symptom-free.

CS angiography was done after the RF. It revealed that ostium atresia of CS and CS was connected with anomalous venous drainage into persistent left superior vena cava (PLSVC), very thin in diameter (**Figure 1**).

3. DISCUSSION

We performed a catheter ablation of a left-sided AV bypass tract in a patient with ostial atresia of CS. The previously reported cases of CS ostial atresia were associated with a few persistent left superior vena cava (PLSVC), an unroofed CS, or were a postoperative complication [1-5]. Patients with CS ostial atresia have been reported to have AVRT[3-5], atrial flutter [4] and atrioven-

tricular nodal reentrant tachycardia (AVNRT) [6]. In all the reported cases, we found that left-sided AP is in the majority.

The recognition of this anomaly is important for at least two reasons. First, it might prevent futile attempts to access the CS conventionally which might lead to prolonged x-ray exposure and serious complications such as cardiac perforation. If the patient was suffering from the AVNRT, lesion of slow pathway region would be familiar. Second, in the presence of this anomaly, particularly the PLSVC may be arrhythmogenic due to its intricate relation with the ligament of Marshall and a dilated CS [7]. Both conditions are known to favor arrhythmogenesis. So, in our patients, recording potential or pacing mapping from the PLSVC or CS was important. After the ablation, the PLSVC and CS were cannulated, and extraordinary potential has not been recorded.

Catheter ablation of a left free-wall AP is usually performed under the guidance of a reference electrode, though ablation without a reference catheter has been reported in a few experienced centers [8,9]. In our patient, the placement of a multipolar electrode catheter only revealed the position of the ostial of CS. By endocardial mapping of the multipolar electrode, we knew the AVRT came of a left-sided AP. Without a reference catheter, mapping of the mitral valve annulus couldn't be accurate. So, experience of the operator was more important.

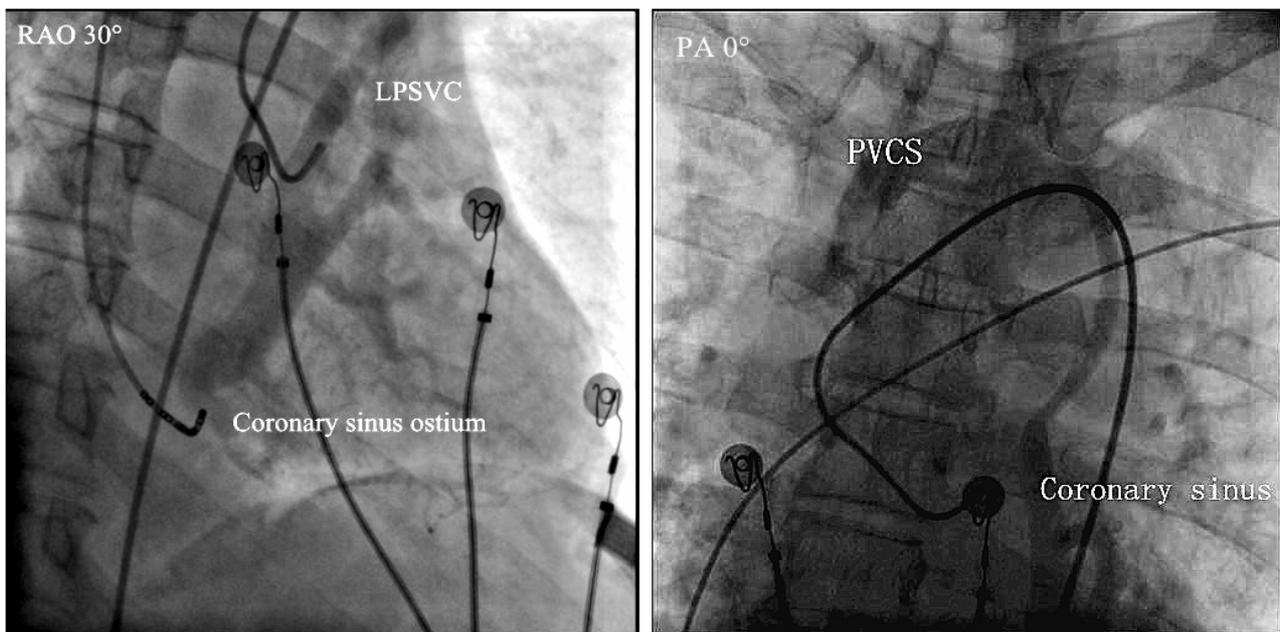


Figure 1. Coronary angiography after successfully ablation. (Left) Ablation catheter had been evacuated. Distal electrode of multipolar catheter was positioned on the ostial of the coronary sinus (CS). Coronary angiography showed ostium atresia of coronary sinus (CS). (Right) coronary sinus (CS) was connect with anomalous venous drainage into left-persistent vena cava superior (L-PVCS), very thin in diameter.

In conclusion, we report a case of CS ostial atresia with anomalous venous drainage into PLSVC with a left-sided AP that was successfully eliminated by catheter ablation.

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