Supraventricular Tachycardia in a Patient with an Interrupted Inferior Vena Cava

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KEYWORDS

• Supraventricular tachycardia • Inferior vena cava • Cardiac • Azygous vein • Atrial tachycardia • Ablation

KEY POINTS

- The noncoronary cusp and aortomitral continuity should be evaluated for early atrial activation when atrial tachycardias are noted to arise near the His bundle region, especially when the activation is diffuse around the His and when the P-wave morphology predicts a left atrial focus.
- In patients with congenital anomalies, alternate routes for catheter position need to be explored, including retrograde access for left atrial tachycardias and positioning of intracardiac echocardiography in the azygous vein for visualization of intracardiac structures.
- Consideration of remote magnetic navigation, if available, is another approach.

CLINICAL PRESENTATION

A 27-year-old woman with a history of an interrupted inferior vena cava (IVC) and previous ablation for atrioventricular (AV) node reentry tachycardia presents with recurrent tachycardia. She experiences daily palpitations with presyncope and has failed treatment with β-blockers and calcium channel blockers. She is referred for another electrophysiology study and possible ablation.

CLINICAL QUESTION

How should vascular access be approached in patients with an interrupted IVC?

ELECTROPHYSIOLOGY STUDY

Preparation was made for possible transhepatic access with interventional radiology.[1] A superior access approach was attempted but not successful because of anatomic challenges. Venous access was then obtained in the left femoral vein and, under fluoroscopic guidance, 2 decapolar catheters were inserted through the left femoral vein, azygous vein, and superior vena cava, and into the right atrium, His bundle region, right ventricle, and coronary sinus (Fig. 1). These catheters were exchanged through the study for an ablation catheter and a duodecapolar catheter that was placed through the right atrium into the coronary sinus. At baseline, the patient was in normal sinus rhythm with a normal AH interval of 62 milliseconds and a prolonged HV interval of 65 milliseconds (Fig. 2).

Ventricular pacing at baseline showed complete ventriculoatrial (VA) dissociation. Atrial extrastimulation did not reveal the presence of a slow pathway. VA conduction was present on isoproterenol and para-Hisian pacing was consistent with a nodal response. Atrial burst pacing on isoproterenol reliably induced a tachycardia with a variable cycle length up to 280 milliseconds (Fig. 3). The septal VA time in tachycardia was greater than 70 milliseconds. Ventricular overdrive pacing was performed multiple times. It was unable to accelerate

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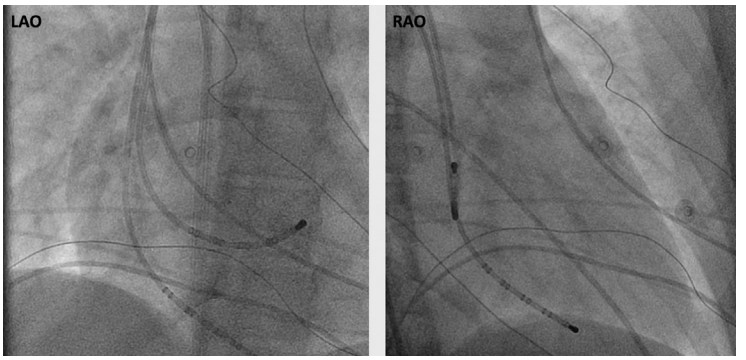

Fig. 1. Left anterior oblique (LAO) and right anterior oblique (RAO) projection of the 2 decapolar catheters coming up the azygous vein and into the heart.

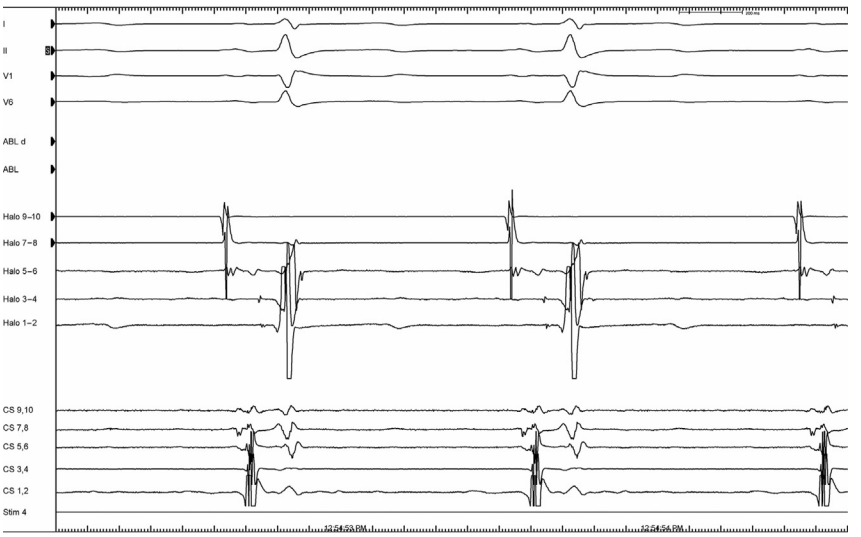

Fig. 2. Baseline intracardiac electrograms. One decapolar catheter is placed across the right atrium, His bundle electrogram, and right ventricle, and the other into the coronary sinus.

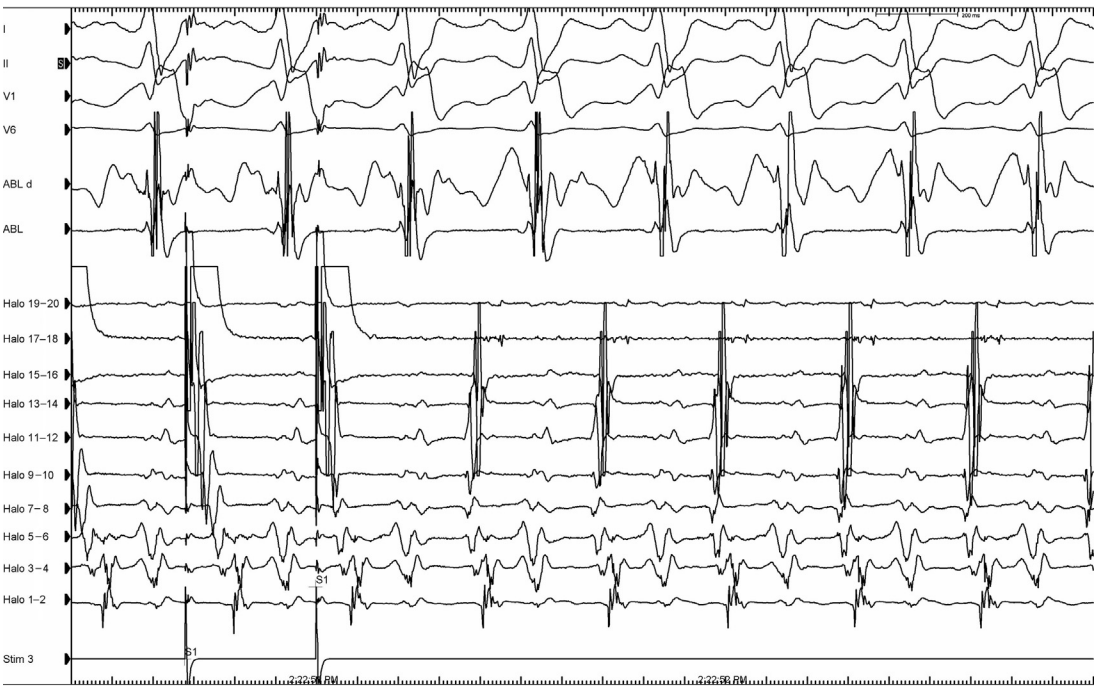

Fig. 3. Initiation of tachycardia. A duodecapolar catheter is in the right atrium (Duo 17–18 in high right atrium) and the distal electrodes are in the coronary sinus. The mapping catheter is located in the ventricle.