Successful slow pathway ablation in a patient with persistent left superior vena cava

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Persistent left superior vena cava (PLSVC) is a rare vascular variant which can add difficulties to slow pathway (SP) ablation procedures because of the disturbed anatomy of the triangle of Koch. We describe a case of a successful SP ablation using an anatomical approach in a patient with PLSVC.

Case report
A 64-year-old woman, with previous episodes of poorly tolerated paroxysmal supraventricular tachycardia, was admitted for radiofrequency (RF) ablation. The surface ECG was compatible with typical atrioventricular nodal re-entrant tachycardia (AVNRT) which was confirmed during the procedure (see Supplementary material online, Figure S1). Three catheters (our routine in cases of suspected typical AVNRT) were introduced by right femoral vein: two quadripolar catheters (Biotronik MultiCath 4J) were positioned in an enlarged coronary sinus (CS) and in the high right atrium, respectively, and one 4 mm ablation catheter (Biosense Webster, Celsius) was used for mapping and ablation. The course of the CS catheter was unusual (Figure 1, left), and the presence of persistent left superior vena cava (PLSVC) with right superior vena cava atresia was documented by venography (Figure 1, right). The most posterior His potential was recorded at the upper border of the enlarged CS ostium (Figure 1, left). This position was documented with the mapping catheter and stored on the X-ray review monitor.

Slow pathway (SP) ablation was obtained in the posteroseptal area, corresponding to the superior third of the CS ostium, outside it, after failed attempts at a more posterior region. We did not search for SP potentials. The stability of the ablation catheter was good, and we did not need an additional long sheath. Accelerated junctional rhythm occurred immediately after beginning of RF delivery (40 W, 55 °C), without damage to the fast pathway; subsequent RF applications were performed under atrial overdrive pacing. The junctional rhythm persisted for 24 h. The patient was discharged on the third day; AVNRT did not recur 3 months later.

Discussion
Persistent left superior vena cava is a rare anomaly encountered in <0.5% of the general population, but it may occur in up to 1.2% of patients with AVNRT.1 During electrophysiological studies, PLSVC can be suspected by the characteristic course of the catheters from the right atrium, through the enlarged CS into the PLSVC (or vice versa, if the superior caval venous system is used for access). In these patients, SP ablation can be more difficult because of the disturbed anatomy of the triangle of Koch in the presence of an enlarged CS ostium.2,3 Previously, several specific observations were reported3: (i) a His potential could be recorded at the upper border of CS ostium, designating a small triangle of Koch; (ii) persistent accelerated junctional rhythm could be induced by RF application in the vicinity of the enlarged CS ostium; and (iii) the usual target for SP ablation (i.e. the posteroseptal area in front of the CS ostium) was sometimes unsuccessful, and in such cases, an SP potential-guided approach inside the CS was used instead. In our case, we confirmed the previous first two observations, but not the third, namely, we were able to achieve successful SP ablation outside the CS ostium and without searching for SP potentials.

In conclusion, we report a successful SP ablation using the anatomical approach in a patient with PLSVC and typical AVNRT. The most posterior His recording site corresponded to the superior border of the enlarged CS ostium, illustrating how the disturbed

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Figure 1 Slow pathway ablation in a patient with PLSVC. (Left) Position of the three electrophysiology catheters, inserted by right femoral approach, in left anterior oblique projection. Two quadripolar catheters were placed at high right atrium (HRA) position and into the dilated CS (dotted white line), respectively. The tip of the 4 mm ablation catheter (Abl) was positioned in front of the CS ostium, midway between its superior and inferior borders. The location of the recording of the proximal His bundle potential is depicted in the figure (large dot). (Right) The presence of PLSVC with right vena cava atresia was confirmed by subsequent venography.

geometry of the triangle of Koch can add difficulties for SP ablation in these cases. Persistent accelerated junctional rhythm was observed during and after the procedure, but was not associated with fast pathway damage. It could be speculated that the sustained pattern of this rhythm is related to a larger volume of nodal or perinodal tissue heated during RF applications which, in turn, could be due to a particular position of the ablation catheter relative to the AV node.

Supplementary material
Supplementary material is available at Europace online.

Conflict of interest: none declared.

References