

Successful ablation at the left coronary sinus cusp of an accessory pathway at the aortic-mitral continuity

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Accessory pathways are rarely seen at the aortic-mitral continuity. A 27-year-old male presented with wide-complex tachycardia. Sinus rhythm electrocardiogram demonstrated pre-excitation, positive in V1-6, I-III, aVF, negative in aVL and aVR. Programmed stimulation showed non-decremental conduction. Morphology of pre-excited beats was similar to ventricular arrhythmias from the left coronary cusp (LCC). Earliest ventricular activation was identified above the LCC leaflet.

Accessory pathways (AP) can occur along the mitral and tricuspid annulus. The anterior mitral annulus that forms the aortic-mitral continuity is fibrous and devoid of AP. Only two cases of successful AP ablation in the left coronary cusp (LCC) have been reported.^{1,2} We report a case of a LCC AP with only antegrade conduction and non-decremental properties, and describe our ablation technique to approach this rare AP.

Case

A 27-year-old male presented wide QRS tachycardia at 170 beats/minute. Baseline 12-lead electrocardiogram (ECG) demonstrated sinus rhythm with pre-excitation. The delta wave was positive in V1-V6, I, II, III, aVF and negative in aVL and aVR, suggesting a left anterior AP. (Figure 1) Particularly, delta waves in I, V1, and aVF were positive, suggesting an anterior/anterolateral AP; however, a positive V6 delta wave suggests a more anterior location. There was also no S-wave in V5 + 6.

During the electrophysiology study, an octapolar catheter was advanced into the coronary sinus with the distal electrode into the great cardiac vein. Programmed ventricular stimulation demonstrated physiological conduction over the His-Purkinje system. Programmed atrial stimulation showed non-decremental conduction. There was augmentation of AP conduction in the premature atrial extras, with QRS widening and almost loss of the V1 S-wave, similar to ventricular arrhythmias from the LCC. (Figure 1) A 3.5-mm irrigated radiofrequency (RF) ablation catheter was introduced via the retrograde aortic approach for mapping.

Mapping in the left ventricle (LV) showed the earliest ventricular activation just below the LCC, preceding the delta-wave onset by 27 ms. Radiofrequency energy was applied at this site (power-control mode; max cut-off = 40 W). The AP transiently blocked after 34 s; however, the catheter was unstable in this position and dislodged into the aorta. Due to instability, mapping above the LCC leaflet was

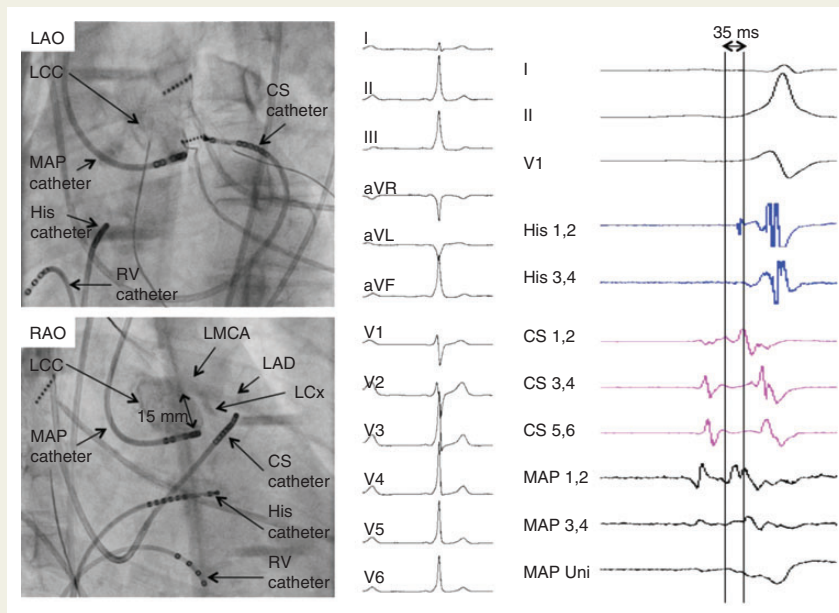


Figure 1 Left: fluoroscopic location of the ablation catheter in the left coronary cusp. Middle: baseline 12-lead ECG with pre-excitation. Right: ventricular activation preceded the delta-wave onset by 35 ms at the successful ablation site.

performed and demonstrated the earliest ventricular activation within the LCC, preceding the delta-wave onset by 35 ms. (Figure 1) This highlights that the true ventricular insertion may be missed due to the complex anatomy in this area, and in addition, the catheter could not be maintained in a stable position below the LCC. We therefore strongly recommend ablation of APs at the LCC above the leaflet for stability.

Contrast medium was injected using the irrigated ablation catheter and demonstrated that the catheter tip was 15 mm from the left main coronary artery (LMCA) ostium (Figure 1). Aortic angiography should be performed to visualize the LMCA ostium to avoid damage. Continuous fluoroscopy or 3D-mapping, combined with conventional RF energy delivered by switching off irrigation, and at a lower power output, should minimize this complication. Use of an irrigated-tip catheter to inject contrast for angiography decreased the number of arterial punctures required to simultaneously visualize the LMCA and catheter. Conventional RF energy was delivered (power-control mode; max cut-off = 25 W), with AP block at 7 s after the start of RF application.

Conclusion

This case demonstrates our ablation approach for rare APs at the LCC. It emphasizes the importance of considering this rare location when the delta-wave suggests an anterior location.

Conflict of interest: none declared.

Author contributions

All authors were involved in the drafting and critical revision of the manuscript.

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