

Paroxysmal tachycardia with wide QRS complexes, right bundle branch block pattern and left axis deviation: A seldom electrophysiological mechanism.

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Introduction: Atrioventricular pathways with slow and exclusively anterograde decremental conduction (Mahaim fibers) are almost exclusively located at the tricuspid valve annulus. Left-sided Mahaim fibers have only rarely been described.

Case presentation: An electrophysiological study was performed in a 15-year-old boy due to recurrent episodes of a wide QRS complex tachycardia with an inferior axis and a right bundle branch block pattern. During sinus rhythm no preexcitation was present. During atrial pacing widening of the QRS complexes was noted exhibiting a right bundle branch block pattern and left axis deviation identical with the morphology of the clinical tachycardia. There was no change of the AV interval but fusion of the His potential with the onset of the right bundle branch potential of the His catheter which was still preceded by the onset of the wide QRS complex of the surface ECG verifying preexcited QRS complexes. Right ventricular pacing demonstrated earliest atrial retrograde activation at the His bundle catheter.

Clinical tachycardia with a cycle length of 292 msec and retrograde 1:1 ventriculo-atrial activation was induced by programmed atrial pacing. Earliest ventricular activation was noted at the left posterior aspect of the mitral valve annulus and earliest retrograde atrial activation was noted at the His bundle catheter. Tachycardia could be entrained by atrial extrastimuli.

Subsequently, detailed mapping was performed at the atrial aspect of the mitral valve annulus during tachycardia. In the left posterior region local ventricular electrograms preceded the ventricular electrograms of the coronary sinus catheter leads by 5 msec. RF application at this location terminated the tachycardia by antegrade conduction block. Subsequently, there was no further evidence of preexcitation during repeat atrial pacing and tachycardia was not inducible anymore. During a follow-up of 2 years no tachycardia recurrence was noted.

Conclusion: Left-sided decrementally conducting accessory pathways are rare. In patients with atrioventricular or atriofascicular Mahaim fibers successful radiofrequency ablation can be performed by mapping the earliest ventricular activation at the mitral valve annulus.