Atrial Tachycardia Originated from Posterior Vein of Left Ventricle

Introduction: Although coronary sinus (CS) musculature is a common origin for focal atrial tachycardia (AT), ATs from ventricular branches of coronary sinus are rarely documented. Here we report an AT originating from the posterior vein of left ventricle (PVLV), which was successfully ablated where large V potential was present.

Methods: A 49-year old transgender male presented with recurrent episodes of palpitation. EKG during symptom seemed to be supraventricular with a long R-P interval. Previous history included patent fossa ovalis. Electrophysiology study and ablation was performed.

Result: Retrograde conduction demonstrated “nodal” pattern during para-Hisian pacing and retrograde right bundle branch block. Narrow complex tachycardia (cycle length approx. 320ms) could be readily induced by atrial pacing from CS ostium without A-H jump. Earliest atrial activation was at CS5-6. Ventricular overdrive pacing was associated with termination of tachycardia and failure to entrain. We paced atrium at tachycardia cycle length and measure A-H interval, which was found identical to that during tachycardia, thus making AVNRT unlikely. We went across the PFO and map the left atrium. During tachycardia the earliest activation site was at mitral annulus (the same activation time as CS5-6), where ablation failed to terminate the tachycardia. Then ablator was pulled out of LA and map the coronary sinus. Local activation time (LAT) was 11msec earlier than earliest CS bipole (CS catheter moved). Burning here was still unsuccessful. Then venogram was performed to look for potential local anatomical abnormalities inside CS. No aneurysm or diverticulum was discovered but PVLV was found near the earliest activation site. Ablator at the ostium of the vein recorded a larger V, suggesting the close relationship with ventricular epicardium. But local A was even earlier than in the main branch of CS (15msec earlier than CS). After the catheter position was confirmed not being adjacent to any coronary artery branch, RF was delivered and tachycardia was terminated within one second.

Conclusion: AT originating from the musculature of ventricular branch of CS can be identified with small and early A with large V inside CS branch. Venogram can be helpful in clarifying the anatomy of coronary vein system in specific cases. Although the origin was at the “ventricle side”, it was considered to have no direct connection to the ventricles, but has electrical conduction to atria through CS instead.