Adenosine Sensitive Focal Atrial Tachycardia from the Mitral Annulus in Rheumatic Valve Disease

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Introduction: Focal Atrial tachycardia (AT) that is responsive to intravenous Adenosine, although infrequent, has been described; but only one report has described such an AT arising from the Mitral Annulus. Adenosine responsive AT arising from a diseased Mitral Valve has not been previously described.

Methods: A 56 years old female, who was a known case of Rheumatic Mitral Valve Disease (RMVD) of more than 19 years, presented with history of frequent episodes of palpitations since 1 month. The electrogram during episodes showed a long RP narrow QRS tachycardia at a rate of 188 bpm (Fig.1A). Each episode of tachycardia was terminated by intravenous administration of 12 mg Adenosine Tri Phosphate. Echocardiography evaluation showed moderate Mitral Stenosis (MVA=1.3 cm²) with moderate mitral valve regurgitation. The left ventricular size and function was normal. The left atrial diameter was 3.3 cm.

Result: After informed consent, electrophysiology study was done in the post-absorptive state, under local anesthesia. Quadripolar catheter was positioned in the right atrium (RA) and a decapolar catheter was positioned in the Coronary Sinus (CS). The Tachycardia was reproducibly induced by rapid atrial pacing; it was not induced on isoprenaline Infusion and did not show a warm-up or cool down phenomenon. Intracardiac signals showed earliest atrial activation in the mid- CS and late activation in the RA (Figure 1B). A 4mm Irrigated Tip Ablation Catheter (FLEXABILITY™ irrigated ablation catheter, Abbot Vascular, Salt Lake, Santa Clara, CA, USA) was positioned at the mitral annulus via trans-septal puncture. Pacing maneuvers done at the mitral annulus around the earliest atrial activation site, did not show entrainment with concealed fusion and the post pacing cycle length was 50 msecs longer than the tachycardia cycle length. Ventricular Extra Stimulus during tachycardia elicited a VA-AV response. Mapping along the annulus showed a site with atrial electrogram 10 msecs earlier than the earliest atrial electrogram in the CS catheter; with an electrogram duration of 30 msecs (Figure 2). The above features were consistent with a focal AT. A single Radio-Frequency energy (60W, 60o, 17 ml/sec) terminated the tachycardia within ten seconds of energy application (Figure 3). The tachycardia remained non-inducible at 15 mins. post ablation.

Conclusion: 1) Focal atrial arrhythmia arising along a diseased mitral annulus may appear late in the history of rheumatic heart disease. 2) This is the first report where such an AT from an area of significantly diseased mitral valve has been shown to be sensitive to Adenosine. This could indicate a paradigm shift, as generally in patients with structural heart disease and AT, Adenosine has not been a preferred drug for cardioversion. 3) Radiofrequency catheter Ablation should be the treatment of choice for such arrhythmia.