Idiopathic ventricular tachycardia originating from the left/right coronary cusp commissure in two pediatric patient; A unique entity with specific electrophysiologic features

Ergul Y., Kafali H.C., Gulgun M.
Saglik Bilimleri University, Mehmet Akif Ersoy Thoracic and Cardiovascular Surgery Center, Department of Pediatric Cardiology/Electrophysiology, Istanbul, Turkey

Idiopathic ventricular tachycardias (IVT) originating from the left/right coronary cusp (L-RCC) commissure are rare. They have some unusual electrophysiologic features, and only a few reports from adult cases are found in the literature. We present two pediatric cases, ablated with radiofrequency (RF) energy.

**Case-1:** A 9-year old, 26 kg girl was referred to our hospital with symptomatic sustained VT attacks, and syncope. VT was stopped with electrical cardioversion during the last attack, because of hemodynamic instability under medical therapy with metoprolol, diltiazem and amiodaron infusion. ECG characteristics of VT were a tachycardia cycle length (TCL) of 330 ms, wide QRS complexes characterized by left bundle branch block (LBBB) morphology, positive in inferior leads and lead D-I, transition zones between precordial leads V3 and V4 and maximum deflection index (MDI) of 0.74. Transthoracic echocardiography showed no structural pathology and normal ventricular contraction. Interestingly, Holter-ECG monitoring didn’t reveal any premature ventricular contraction (PVC). During the electrophysiologic study (EPS), she had no PVCs and sustained VT was induced with orciprenaline and dobutamine infusion. During activation mapping of VT in right and left ventricular outflow tracts (RVOT and LVOT), the earliest local endocardial activation sites (ELEAS) were found at posteroseptal region of RVOT with -32 ms and at the L-RCC commissure in LVOT with -62 ms (Figure 1-A). The focus was ablated successfully with 5F RF-catheter using 25 watt energy (Figure 1-B), and above the aortic valvar annulus plane, an unusual location for most aortic cusp VTs.

**Case-2:** A 16-year-old girl admitted to our department with recurrent palpitations and documented VT during her last attack, terminated with amiodarone infusion. ECG properties were similar to first patient with TCL:310ms and MDI:0.68. Again, holter monitoring revealed no PVCs. During activation mapping of VT, ELEAS were found at posteroseptal region of RVOT with -37 ms and at the L-RCC commissure in LVOT with -65 ms (Figure 1-C). It was ablated successfully with 7F RF-catheter, using 25 watt energy (Figure 1-D).

**In conclusion:** IVTs originating from L-RCC commissure have specific features including absence of premature ventricular contractions, high MDI index suggesting epicardial origin, and ELEAS values for typical RVOT-VTs on EPS, causing to misinterpretation unless a LVOT-mapping is done.

**Figure-1:**
A. Fluoroscopic image from the first case showing two diagnostic catheters in RVOT posteroseptal and LVOT L-RCC commissure regions with ELEAS values, very close to each other.
B. Intracardiac ECG records from the first case during successful RF ablation, showing a ‘burst’ VT acceleration and abrupt cessation in the 9. second of the first RF energy application.
C. 3-D electroanatomic image from the second case showing target lesions at L-RCC commissure with ELEAS for ablation, and their relation to LMCA.
D. Intracardiac ECG records from the second case during successful RF ablation.