Successful catheter ablation of symptomatic premature ventricular contractions originating from mitral annulus

Introduction

Premature ventricular contractions (PVC)/ventricular tachycardia’s (VT) rarely originate from mitral annulus (1). In these cases, radiofrequency catheter ablation (RFCA) is an important treatment option.

Herein, we present a patient with PVC refractory to medical therapy, who was successfully treated with RFCA.

Case Report

A 20-year-old male patient was admitted to our department with the complaint of palpitation. He had been having palpitations for 4 years. Medical treatment with calcium channel blocker and beta-blocker was unsuccessful. Physical examination of cardiovascular and other systems was normal. Resting electrocardiogram (ECG) showed PVCs with a right bundle branch block morphology and inferior axis (Fig. 1). QRS notching was observed in the inferior leads of the PVCs. Exercise ECG and transthoracic echocardiography were within the normal range. The monomorphic PVCs (8000 beats/day) were detected in Holter ECG. Electrophysiological study was performed. Programmed ventricular stimulation did not induce ventricular tachycardia. Electrophysiological mapping was performed during PVCs. During PVC, the earliest ventricular activation was seen in the distal electrode of the coronary sinus. After placing the steerable 4-mm-tip ablation catheter (Mariner; Medtronic, Minneapolis, MN, USA) to the left ventricle with retrograde aortic approach, mapping of the aortic cusps and left ventricle outflow tract was performed. Early activation site was not detected at the aortic cusp and left ventricle outflow tract. With left ventricular mapping, earliest ventricular activity during PVCs was recorded in the anterolateral of the mitral annulus. In this site during the PVC, local ventricular activation preceded the QRS onset by 28 ms (Fig. 2). Radiofrequency ablation applied to this site and PVCs disappeared (Fig. 3). PVCs were not observed during follow-up examinations at second month.

Discussion

Idiopathic PVCs mostly originate from ventricular outflow tracts. RFCA is successfully performed to these sites. Premature ventricular contractions are not observed on the ECG after the procedure.
contraction/ventricular tachycardia’s originating from mitral annulus are rarely reported (1).

PVCs arising from the mitral annulus frequently originate from anterolateral, posteroseptal and posterior sites (2). It has been reported that 2/3 of the PVCs arising from the mitral annulus originate from anterolateral site (2). Furthermore, small part of these arrhythmias originates from the posteroseptal site of the mitral annulus. Ablation of this site may be technically very challenging. Cases have been reported that successful catheter ablation of the premature ventricular contraction origin from the anteroseptal site of the mitral annulus can be performed either by a transeptal or transaortic approach in literature (3, 4). Anterolateral site of the mitral annulus is in close proximity to anterior of the right ventricle outflow tract, left ventricular epicardium near to the left sinus Valsalva and subvalvular region of the left ventricular outflow tract. Idiopathic PVC/VTs frequently originates from these sites that support this theory (5). In our case, early activation sites are not detected at the aortic root region and left ventricle outflow tract. By mapping of the left ventricle, at the time of PVCs, earliest ventricular activity is recorded in the anterolateral of the mitral annulus. In this site during the PVC, local ventricular activation preceded the QRS onset by 28 ms, when radiofrequency ablation applied to this site, PVCs immediately disappeared.

Adequate analysis of characteristics of ECG helps to determine the origin of mitral annulus sourced PVC/VT and may shorten the duration of the electrophysiological study. While the PVCs originating from anterolateral of mitral annulus has inferior axis, those originating from posterior annulus has superior axis. While QRS polarity in DI and aVL leads of PVCs originating from anterior annulus is negative, those originating from posterior annulus have positive QRS polarity in DI and aVL leads. Additionally it is shown that all the patients ECGs with mitral annulus originated PVC/VTs have s waves in lead V6 (2). In our case, ventricular premature contractions showed right bundle branch block pattern. Derivasyon lead (DI) showed rS pattern, V6 lead had an s wave and inferior axis. QRS notching in the inferior leads supported anterolateral origin. All these ECG findings showed that premature contractions were originating from anterolateral site of mitral annulus.

Conclusion

Premature ventricular contraction with right bundle branch block pattern can originates from mitral annulus. Medical therapy is the treatment of choice in these patients. Radiofrequency catheter ablation should be considered in patients’ refractory to medical therapy.

Ömer Uz, Fethi Kılıçaslan, Mehmet Tezcan
Department of Cardiology, Gülhane Military Medical Academy, Haydarpaşa, İstanbul-Turkey

References