Int J Clin Exp Med 2015;8(3):4690-4693
www.ijcem.com /ISSN:1940-5901/IJCEM0004879

Case Report

Idiopathic ventricular premature contractions originating from the postero-lateral tricuspid annulus leading to left ventricular disfunction

Gabriel Cismaru[1], Petru Mester[1], Lucian Muresan[1], Radu Rosu[1], Gabriel Gusetu[1], Mihai Puiu[1], Dana Pop[1], Petru-Adrian Mircea[2], Dumitru Zdrenghea[1]

[1]Department of Cardiology, Rehabilitation Hospital, University of Medicine and Pharmacy Iuliu Hatiegnu Cluj-Napoca, Cluj-Napoca 400347, Romania; [2]Medical Clinic No 1, University of Medicine and Pharmacy Iuliu Hatiegnu Cluj-Napoca, Cluj-Napoca 400347, Romania

Received December 15, 2014; Accepted February 9, 2015; Epub March 15, 2015; Published March 30, 2015

Abstract: A 19-year-old patient with premature ventricular complexes (PVCs) more than 30% on 24 hours was addressed for catheter ablation. Echocardiography showed left ventricular (LV) dilation and systolic dysfunction with 37% of ejection fraction. The patient underwent investigations including cardiac magnetic resonance (MRI) with no other cause of cardiomyopathy being found. Successful ablation of the postero-lateral tricuspid annulus ectopic focus using conventional radiological guiding resulted in normalization of the LV size and contractility. No PVCs were found at follow-up. To our knowledge, this is the first report of PVCs originating in the postero-lateral tricuspid annulus resulting in LV dysfunction.

Keywords: Premature ventricular complexes, postero-lateral tricuspid annulus, ablation

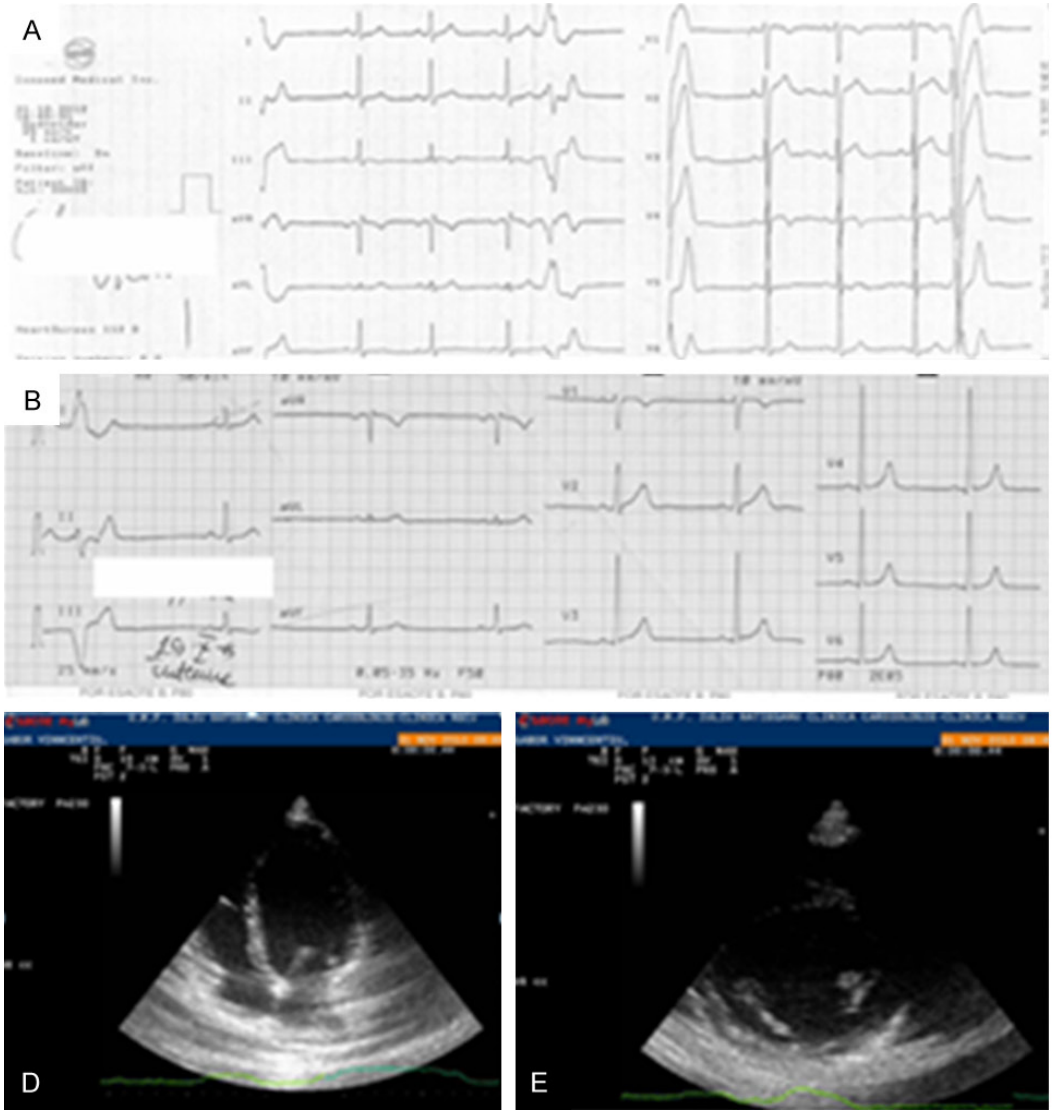
Case presentation

A 19-year-old male patient presented to our cardiology department for catheter ablation. His complaints were palpitations and dyspnea at moderate effort. His past medical history consisted of dilated cardiomyopathy (DCM) from the age of 17 and frequent premature ventricular complexes (PVCs). His symptoms were refractory to betablockers which were used for 6 months before ablation. Holter ECG showed frequent monomorphic PVCs (more than 28.000 on 24 hours). The morphology was: left bundle branch block (LBBB) appearance with superior axis (**Figure 1**). The treadmill exercise test showed no ischemia but PVCs were present through the test. Echocardiography revealed dilated LV (60/41 mm) with global hypokinesia and EF of 37%. Cardiac MRI showed LV dilation with EDV=266 ml and ESV=185 ml and EF of 31%. No signs of right ventricular dysplasia/cardiomyopathy (ARVD /C), LV non-compaction, myocardial infarction or myocarditis were present. Given the high number of PVCs in a patient with DCM and the insuccess of betablockers, ablation was proposed.

The site with perfect 12/12 pace map (**Figure 2**) was obtained at the postero-lateral aspect of the tricuspid annulus. The catheter tip demonstrated the location of tricuspid annulus in the RAO and LAO views and atrial and ventricular electrograms were present at this site with a ratio of <1. Ablation eliminated the PVCs within the 15 seconds after radiofrequency delivery. No PVCs were seen during 24 hours Holter monitoring before discharge. No recurrence of arrhythmia was present on the Holter ECG at 3, 6 and 12 months follow-up. A repeat echocardiography at 6 months showed normal LV dimensions and volumes with an EF of 55%. No echocardiographic or MRI abnormalities suggestive of ARVD/C were found before ablation and during follow-up. Therefore we believe that PVCs in this patient were idiopathic.

Discussion

PVCs arising from the postero-lateral aspect of the tricuspid annulus demonstrate a LBBB QRS morphology and positive QRS polarity in lead I and V6 [1]. The myocardium in this case is depolarized from right to left toward lead I and V6 which gives the positive QRS morphology. As



C

PVC	Total/Time	max/h	Duration
PVC	28018	1749	
Couplet	37	8	
Triplet	6	3	
VTachycardia	0	0	
Longest	-		-
Highest Rate	-		-
Bigeminy	2459	231	
Longest	8:33:56 AM		00:00:51
Highest Rate	2:31:18 PM		00:00:02
Trigeminy	1274	152	
Longest	4:29:22 PM		00:03:19
Highest Rate	2:16:03 AM		00:00:10

Figure 1. Initial evaluation of the patient with frequent VPCs. A, B: Twelve-lead ECG showing the morphology of ventricular premature beat. Precordial leads: left bundle branch block in lead V1 with precordial transition at lead V5. The limb leads show R complex in lead I and avL, rs in lead II, QS in lead III and avF. Please note the notching of the QRS complex in the limb leads. C: Holter EKG on 24 hours reveals frequent VPCs: 28.018 on 24 hours representing more than 30% of the total beats. D, E: Echocardiography apical view and parasternal short axis showing dilated left ventricle with moderate decrease of the ejection fraction.


A
B
C
D
E

Figure 2. Electrophysiological study and ablation of the VPCs. A: 12-lead morphology of the VPCs during electrophysiological study. B: Pace-mapping in the left ventricle demonstrates right bundle branch block morphology. C: Pace-mapping in the RVOT shows left bundle branch block morphology but inferior axis (positive QRS complex in lead II, III and avF). D: Pace-mapping on the postero-lateral tricuspid annulus shows 12/12 concordance with the spontaneous VPC of the patient. E: Before discharge Holter ECG shows no VPC on 24 hours in the absence of medication.

suggested by Tada QRS polarity in lead avL is positive in almost all PVCs arising from the annulus and the inferior leads (II, III and avF) are negative if originating from the posterior portion of the annulus. He also found that PVCs originating from the free-wall portion of the annulus show a notched QRS complex with a longer duration of the QRS and the R-wave transition in the precordial leads occur beyond V3 in all cases. Our data are complementary to data provided by Tada et al.

Several studies have found an association between PVCs and LV dysfunction, with reversal after radiofrequency ablation [2, 3]. The PVC burden in our patient was 30.75% (28.018 on 24 hours). As suggested by the study of Baman et al. [4] a PVC burden of more than 24% is most of the time associated with cardiomyopathy and catheter ablation is indicated.

Van Herendal et al. [5] reported 278 patients with idiopathic right ventricular VT or VPCs with 8 patients having the origin at the free-wall portion of the tricuspid annulus. All 8 patients had normal EF. Tada et al. [1] reported in their study on 454 consecutive patients with idiopathic PVCs ablation a number of 4 patients with PVCs originating in the postero-lateral aspect of the tricuspid annulus. All 4 patients had normal EF without any sign of cardiomyopathy. We believe that our case is the first report of PVCs originating in the postero-lateral tricuspid annulus resulting in LV dysfunction.

Conclusions

We presented the case of a 19 year-old patient with frequent PVCs and LV dysfunction. Pace mapping demonstrated 12/12 correlation in the postero-lateral aspect of the tricuspid annulus. Ablation at this level led to disappearance of the PVCs and normalization of the LV function. To our knowledge this is the first report of PVCs originating in the postero-lateral aspect of the tricuspid annulus leading to LV dysfunction, with total resolution after successful ablation.

Acknoledgements

This paper was published under the frame of European Social Found, Human Resources Development Operational Programme 2007-2013, project nr. POSDRU 159/1.5/138776: TRANSCENT.

Disclosure of conflict of interest

None.

Address correspondence to: Dana Pop, Department of Cardiology, Rehabilitation Hospital, University of Medicine and Pharmacy Iuliu Hatiegnu Cluj-Napoca, 46-50 Viilor Street, Cluj-Napoca 400347, Romania. Tel: (40)264207021; Fax: (40)26445313; E-mail: pop7dana@yahoo.com; gabi_cismaru@yahoo.com

References

[1] Tada H, Tadokoro K, Ito S, Naito S, Hashimoto T, Miyaji K, Sugiyasu A, Tsuchiya T, Kutsumi Y, Nogami A, Oshima S, Taniguchi K. Idiopathic ventricular arrhythmias originating from the tricuspid annulus: Prevalence, electrocardiographic characteristics, and results of radiofrequency cathetheter ablation. Heart Rhythm 2007; 4: 7-16.

[2] Yokokawa M, Good E, Crawford T, Chugh A, Pelosi F Jr, Latchamsetty R, Jongnarangsin K, Armstrong W, Ghanbari H, Oral H, Morady F, Bogun F. Recovery from left ventricular dysfunction after ablation of frequent premature ventricular complexes, Heart Rhythm 2013; 10: 172-175.

[3] Redfearn DP, Hill JD, Keal R, Toff WD and Stafford PJ. Left ventricular dysfunction reslting from frequent unifocal ventricular ectopics with resolution following radiofrequency ablation. Europace 2003; 5: 247-250.

[4] Baman TS, Lange DC, Ilg KJ. Gupta SK, Liu TY, Alguire C, Armstrong W, Good E, Chugh A, Jongnarangsin K, Pelosi F Jr, Crawford Tr, Oral H, Morady F, Bogun F. Relationship between burden of premature ventricular complexes and left ventricular function, Heart Rhythm 2010; 7: 865-869.

[5] Van Herendal, Garcia F, Lin D, Riley M, Bala R, Cooper J, Tzou W, Hutchinson MD, Verdino R, Gerstenfeld EP, Dixit S, Callans DJ, Tschabrunn CM, Zado ES, Marchlinski FE. Idiopathic right ventricular arrhythmias not arising from the outflow tract: Prevalence, electrocardiographic characteristics, and outcome of catheter ablation. Heart Rhythm 2011; 8: 511-518.