

## Case Report

# Exercise Induced Sustained Ventricular Tachycardia due to Arrhythmogenic Right Ventricle Cardiomyopathy (ARVC)

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## Abstract

Syncope or documented Ventricular Tachycardia (VT) occurring during exercise could be a sign of Arrhythmogenic Right Ventricle Cardiomyopathy (ARVC). ARVC is a difficult diagnosis and certain criteria (major and minor) must be met. Echocardiography and Cardiac Magnetic Resonance Imaging (CMRI) are essential in diagnosing ARVC where right ventricular dilatation with hypertrophied trabeculae may be a sign of ARVC.

**Keywords:** Ventricular tachycardia; Arrhythmogenic Right Ventricle Cardiomyopathy; Exercise; Cardiomyopathy

## Case Presentation

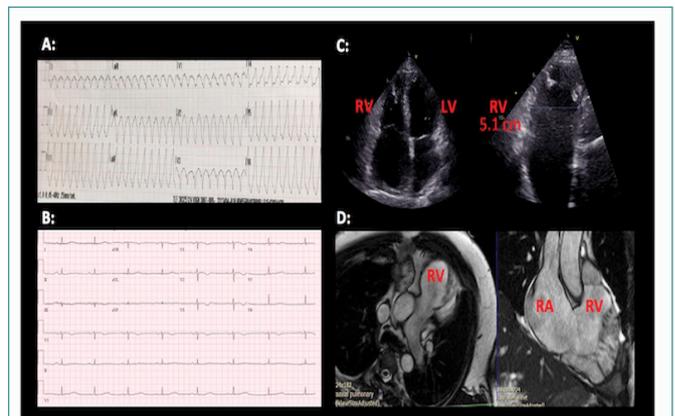
A 60-year old man with a past medical history of paroxysmic atrial fibrillation and mildly depressed Left Ventricular (LV) function was admitted with acute onset of dyspnoea and dizziness during strenuous exercise (spinning).

On arrival the patient was awake, but pale and severely hypotensive with a Blood Pressure (BP) of 70/40 and a very fast regular pulse. The 12-lead Electrocardiogram (ECG) (Figure 1A) showed a monomorphic, fast rhythm with broad complexes and a frequency of 230. The rhythm was diagnosed as sustained VT with Left Bundle Branch Block (LBBB) configuration arising from the outflow tract of the Right Ventricle (RVOT). Synchronized direct current defibrillation was established acutely during propofol-sedation and SR was regained. The BP stabilized at 130/70 with a regular pulse of 55. Amiodarone 400 mg x3 was initiated.

A 12-lead ECG was obtained after SR was restored (Figure 1B), which showed inverted T-waves in lead V1 to V3 and a normal QTc interval of 450 msec. 2D echocardiography was performed (Figure 1C) showing mildly depressed LV function (LV ejection fraction 45%), a severely dilated RV with near-normal function with hypertrophied trabeculae in the RV. Blood test results showed an elevated troponin me of 237 rising to 7410 ng/L and a creatinine level of 113 ymol/L and otherwise normal. Sub-acute coronary angiography showed no significant stenosis. A cardiac Magnetic Resonance Imaging (MRI) (Figure 1D) showed likewise a dilated RV with abnormal morphology and reduced functional capacity. Flow measurements in the pulmonary artery showed restrictive physiology of the RV. The

left ventricle was found with borderline reduced function however otherwise normal MRI.

The patient was suspected of having Arrhythmogenic Right Ventricle Cardiomyopathy, despite no family history of Cardiac Disease or Sudden Death (SCD) before the age of 60 was present. According to current ESC guidelines two positive major criteria (RV dyskinesia and dilated RVOT; inverted T-waves in lead V1 to V3 without right bundle branch block) and one minor criteria (sustained VT with LBBB and positive QRS in lead II, III and a VF and negative QRS in lead a VL) was noted [1]. A double chamber Implantable Cardioverter Defibrillator (ICD) was therefore implanted for treatment of possible future malignant arrhythmia and to prevent SCD. The patient was at hospital discharge referred for genetically testing and further follow-up in the cardiology outpatient clinic [2,3].



**Figure 1:** (A) 12-lead ECG showing a monomorphic ventricular tachycardia. (B) 12-lead ECG showing sinus rhythm after cardioversion. (C) 2D echocardiography showing a dilated right ventricle of 5.1 cm. (D) Cardiac Magnetic Resonance imaging showing a dilated right ventricle with excess trabeculation.

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## Discussion and Conclusion

ARVC is characterized by hypokinetic areas of the RV with replacement of the RV myocardium with fibrosis and fat, which may give rise to malignant arrhythmia. ARVC is primarily seen in males, and approximately 30% to 50% of patients have a family history of SCD. It is an important cause of malignant arrhythmia especially in children and young adults, and the diagnosis should be based in mind

when encountering a patient with syncope or registered malignant arrhythmia during exercise.

## References

1. Wang W, James CA, Calkins H. Diagnostic and therapeutic strategies for arrhythmogenic right ventricular dysplasia/cardiomyopathy patient. *Europace*. 2019;21(1):9-21.
2. Marcus FI, McKenna WJ, Sherrill D, Basso C, Bauce B, Bluemke DA, et al. Diagnosis of arrhythmogenic right ventricular cardiomyopathy/dysplasia: Proposed modification of the task force criteria. *Circulation* 2010;121:1533-41.
3. Diez DP, Brugada J. Diagnosis and management of arrhythmogenic right ventricular dysplasia. *E-Journal of the ESC Council for Cardiology Practice*. 2008;7.