Clinical decision making in a challenging case: A case of anomalous origin of the right coronary artery with interarterial course presents with sudden cardiac death

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Background

The anomalous origin of the right coronary artery from the left sinus of Valsalva (ARCA) is a rare congenital anomaly in which the right epicardial coronary artery originates from the left coronary cusp. The course of the ARCA can be high interarterial between the pulmonary artery and the aorta or low between the right ventricular outflow tract and the aorta. When compared to the anomalous origin of the left coronary artery from the right cusp, this anomaly is considered more benign and less likely to result in sudden cardiac death(SCD).

Case Presentation

A 22-year-old healthy man presented to the emergency department by paramedics with witnessed cardiac arrest. Reportedly, the patient collapsed while leaving his work at one of the public stores. When the emergency medical services (EMS) arrived, the patient was found to be in ventricular fibrillation. After successful resuscitation he was transferred to the hospital. His electrocardiogram (ECG) is shown (Figure 1). The laboratory workup revealed normal electrolytes including magnesium and phosphorus. The patient underwent computed tomography angiography (CTA) of the lungs with and without contrast which revealed no pulmonary embolism. However careful examination showed anomalous aortic origin of the RCA from the left coronary cusp with an interarterial course (Figure 2). This was confirmed by invasive coronary angiography (Figure 3). Because the cardiac event happened with a relatively low workload. There was concern that the ARCA finding might be incidental and that his SCD could be secondary to another etiology i.e., inherited arrhythmias.

Presentation

After careful discussion with the patient and his family, the decision was made to proceed with Aortocoronary bypass grafting with reverse saphenous vein to the right coronary artery. The patient also underwent an electrophysiological (EP) study which revealed no inducible ventricular arrhythmia. He was finally discharged on a lifevest, and the plan was to conduct a genetic study in the outpatient settings to rule out inherited arrhythmias. If genetic testing comes negative, then ICD implantation can be safely deferred.

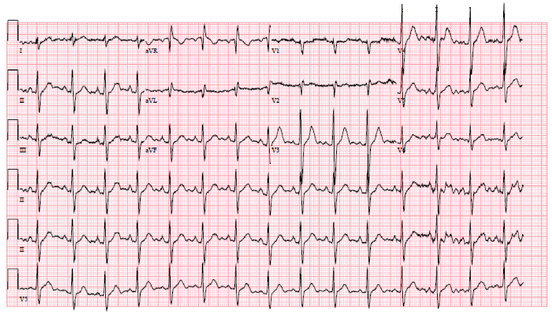

Figure 1. ECG obtained in the hospital showed normal sinus rhythm and right axis deviation with a normal QTc interval of 447 ms.

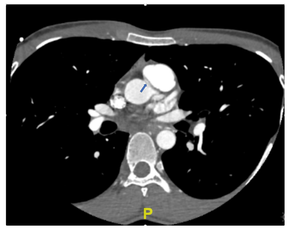

Figure 2. CTA of the heart shows anomalous RCA origin from the left coronary cusp and high interarterial course here.

Figure 3. Invasive coronary angiography of the RCA confirms the anomalous origin from the left coronary cusp.

Discussion

In this case, the patient was not exercising when he experienced SCD. There was a concern that the anomalous origin of RCA was only an incidental finding. Inherited arrhythmias couldn't be safely ruled out. For all those reasons, the patient underwent an EP study which showed no inducible arrhythmias. The patient was discharged home on a lifevest with the plan to conduct a genetic study in the outpatient setting in addition to cardiac magnetic resonance (CMR). If genetic testing and CMR come negative, then ICD implantation can be safely deferred.

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