

Sudden Cardiac Arrest in a Young Athlete due to Anomalous Right Coronary Artery with Interarterial Course

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Abstract

Background: Sudden cardiac arrest represents a catastrophic event in young athletes, frequently stemming from undiagnosed structural cardiac abnormalities. Anomalous aortic origin of coronary arteries constitutes a rare yet potentially lethal congenital anomaly requiring careful consideration during diagnostic evaluation. Although many patients with coronary artery anomalies remain asymptomatic, those with a malignant course, such as an interarterial path between the aorta and pulmonary artery, can experience ventricular arrhythmia and sudden cardiac death.

Case Presentation: A 29-year-old female athlete presented with a sudden onset of out-of-hospital cardiac arrest while running a marathon. She was found to be in ventricular fibrillation and an automated external defibrillator delivered one direct current shock, successfully converting to sinus rhythm.

Initial ECG revealed sinus rhythm with T-wave inversions in leads III and aVF, and a corrected QT interval of 510ms. Initial troponin T levels were 70 ng/L. A CT pulmonary angiogram (CTPA) excluded pulmonary embolism. However, it revealed an anomalous right coronary artery originating from the left coronary cusp.

A coronary computed tomography angiogram (CTCA) was performed, confirming the initial finding of a malignant course of the right coronary artery between the aorta and pulmonary artery. Additionally, a viability MRI was conducted, which showed evidence of inferior wall oedema, consistent with ischaemia in the right coronary artery territory.

Following comprehensive multidisciplinary team evaluation, the patient underwent successful surgical correction via right coronary artery reimplantation into the appropriate right coronary sinus, with uncomplicated postoperative recovery.

Clinical Significance: This case highlights the critical importance of including anomalous aortic origin of coronary arteries in the differential diagnosis of sudden cardiac arrest among young athletes. The successful outcome underscores the vital role of advanced cardiac imaging modalities, including coronary computed tomography angiography and cardiac magnetic resonance imaging, in establishing accurate diagnosis, stratifying risk, and directing appropriate surgical intervention to prevent future cardiac events.