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Case Studies in Critical Care

Surviving sudden cardiac death secondary to anomalous left coronary artery from the pulmonary artery: A case report and literature review

Osama Alsara, MD [a,*], Jagadeesh K. Kalavakunta, MD [b], Victor Hajjar, MD [b], Ahmad Alsarah, MD [a], Nam Cho, DO [b], Gaurav Dhar, MD [b]

[a] Department of Internal Medicine, Division of General Internal Medicine, Michigan State University, East Lansing, MI, USA
[b] Department of Internal Medicine, Division of Cardiovascular Diseases, Michigan State University, East Lansing, MI, USA

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ABSTRACT

Anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) is an uncommon type of congenital coronary anomaly. In adults, the clinical picture of ALCAPA varies widely between being asymptomatic, presenting similarly to other heart diseases, or as malignant arrhythmias. Patients who have cardiac arrest are usually young and do not exhibit prior warning symptoms. In this article we describe a case of a 22-year-old healthy male, who experienced cardiac arrest during exertion. He was then diagnosed with ALCAPA, which was surgically corrected.

Introduction

Coronary artery anomalies are congenital abnormalities in number, origin, course, or termination of the coronary arteries. These conditions are found in about 1% of the population.[1,2] Anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) is a rare coronary artery anomaly associated with high mortality in infants, and is an uncommon diagnosis in adults. Most cases of ALCAPA in adulthood are diagnosed incidentally or after complaints of angina, dyspnea, palpitations, fatigue, syncope, arrhythmia, or cardiac arrest. In this report, we describe the case of a 22-year-old male who survived cardiac arrest secondary to undetected ALCAPA.

Case presentation

A 22-year-old Caucasian male was brought to the emergency department (ED) after an episode of cardiac arrest. He was seen riding his bike when he suddenly collapsed, became unresponsive, and pulseless. Cardiopulmonary resuscitation was started immediately by a witness and emergency medical services were contacted. When paramedics arrived 5 min later, he was found to be in ventricular fibrillation (VF). After defibrillation at the scene, the patient returned to sinus rhythm and was transported to the hospital. Upon arrival to ED, he was unconscious, hemodynamically stable, however ventricular fibrillation was again noted and was converted to sinus rhythm by electrical defibrillation. Subsequently, he was intubated and started on an amiodarone drip as well as a dopamine drip. Further history provided by his mother was significant for a cardiac murmur during his childhood, which was evaluated at that time, however, no heart disease was detected. She reported that he occasionally drinks alcohol, but denied any history of smoking, drugs use, or taking medications. Family history of heart diseases or sudden cardiac arrest was negative as well.

Electrocardiogram (ECG) in the ED showed ST elevation in the inferior and lateral precordial leads and ST depression in the anterior precordial leads (Fig. 1). Therefore, the patient was taken to cardiac catheterization laboratory emergently. During the coronary angiography, the left coronary system was unengageable, and a left ventriculogram showed a mildly reduced left ventricular ejection fraction (LVEF) at 40%. When a right coronary angiography was performed, it revealed a dominant right coronary along with large conus branch supplying extensive right-to-left collaterals to the left

Abbreviations: ALCAPA, anomalous origin of the left coronary artery from the pulmonary; ICD, implantable cardioverter defibrillator; VF, ventricular fibrillation; LVEF, left ventricular ejection fraction.

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* Corresponding author. 788 Service Road, Room B301, East Lansing, MI 48824, USA. Tel.: +1 517 353 5100; fax: +1 517 432 2759.
E-mail addresses: osama.alsara@hc.msu.edu, osamaalsara@yahoo.com (O. Alsara).

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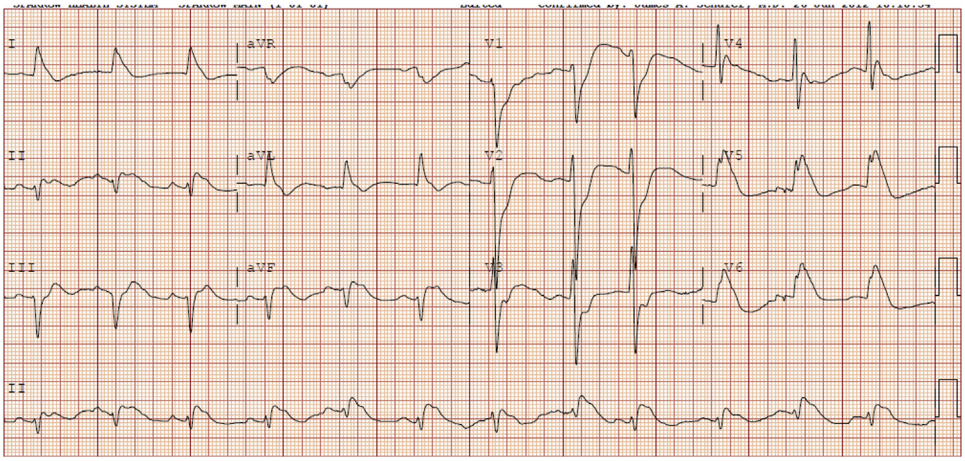

Fig. 1. 12 lead electrocardiogram showing the ST elevation in the inferior and lateral precordial leads along with ST depression in the anterior precordial leads.

coronary artery suggestive of anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) (Fig. 2A, B).

During cardiac catheterization, hypothermia protocol was initiated, and a brain magnetic resonance imaging (MRI) was ordered that suggested an anoxic brain injury. However, primary neurological evaluations in the intensive care unit (ICU) predicted a good prognosis. The patient started to be more responsive and followed commands by the third day in ICU, but his recovery was complicated by aspiration pneumonia which was treated with IV Vancomycin and Piperacillin–Tazobactam. When he was extubated 7 days later, he was fully oriented, exhibited mild memory difficulties, and required minimal assistance for walking.

While in the ICU, additional tests were performed in order to confirm the diagnosis of ALCAPA including a two dimensional (2D)

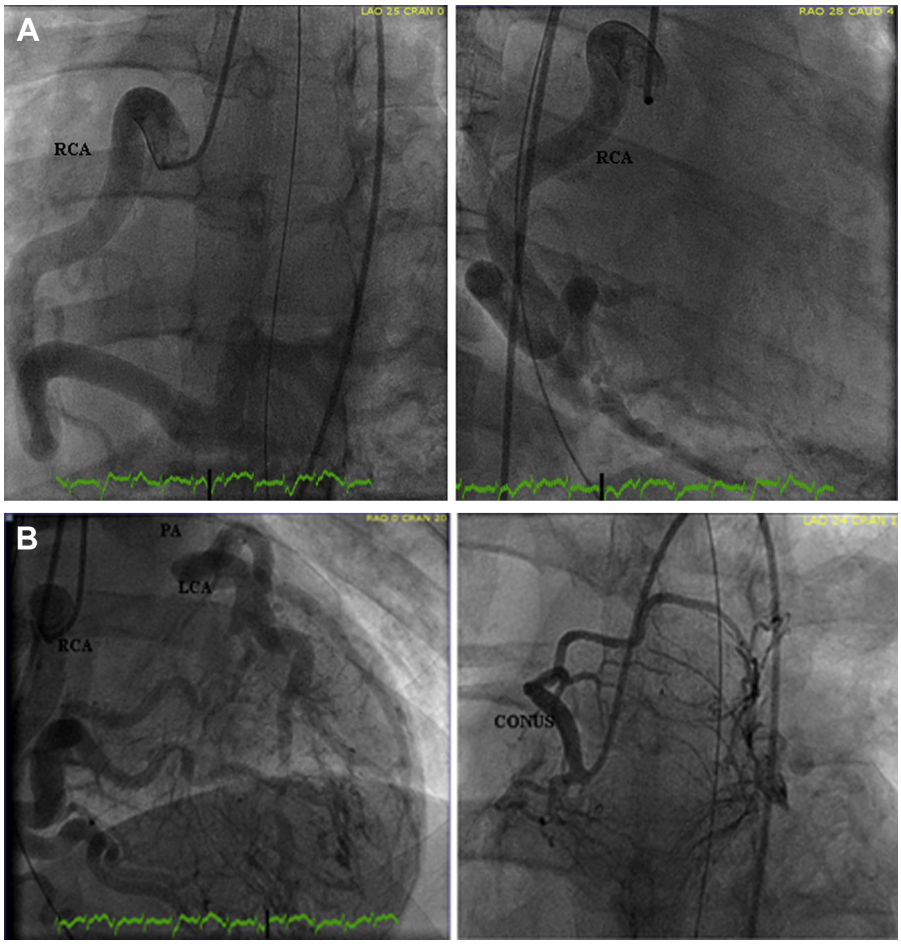

Fig. 2. A) Right coronary angiogram showing large right coronary artery (RCA) viewed in both left and right anterior oblique (LAO and RAO) projections. B) Right coronary angiogram showing extensive collaterals from right coronary artery (RCA) and conus branch to the left coronary arterial system (LCA). PA: pulmonary artery.