

Cardiac Arrest as the Clinical Presentation of the Anomalous Origin of the Left Coronary Artery from the Pulmonary Artery in a 13-Year-Old Adolescent

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Abstract

The case of a previously asymptomatic 13-year-old boy who presented with cardiac arrest after playing football and drinking cold water is presented. He was immediately transferred from the football field to a nearby hospital and resuscitated at the emergency ward. After resuscitation, the EKG showed signs of anterior wall myocardial infarction, and there were elevated serum cardiac enzymes. Exercise isotopic study, transesophageal echocardiography and coronary angiography were performed, and the diagnosis of the anomalous origin of the left coronary artery from the pulmonary artery was established. The patient was successfully treated by direct aortic reimplantation of the abnormal left coronary artery. In this case, cardiac arrest was the first symptom of anomalous origin of left coronary artery from the pulmonary artery. It is recommended to consider this abnormality in young patients with an episode of sudden death (*Iranian Heart Journal 2004; 5(4): 49-52*).

Key words: anomalous origin of left coronary artery ■ cardiac arrest ■ coronary reimplantation

Anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) is a rare malformation that occurs in about 0.4 percent of patients with congenital cardiac abnormalities. In almost all patients, the left coronary artery originates from the posterior sinus of the pulmonary artery.¹ the most common clinical picture is that of an infant who presents with a myocardial infarction and subsequently develops congestive heart failure.² Infants with this abnormality usually present with clinical symptoms at the age of 2 to 4 months with angina-like symptoms. Feeding and defecation often are accompanied by dyspnea, irritability and crying, pallor, diaphoresis and occasional loss of consciousness.

Older children or adults usually present with a continuous murmur or with mitral regurgitation, resulting from dysfunction of ischemic or infarcted papillary muscles. In some instances, this coronary abnormality may go unrecognized until a previously asymptomatic teenager or adult experiences angina, heart failure or sudden cardiac death. We report the case of a 13-year-old boy with this abnormality, successfully resuscitated after cardiac arrest.

Case report

A 13-year-old boy with no history of chest pain, dyspnea or palpitation even during heavy exercise collapsed after playing football and drinking cold water.

Fortunately, the football field was very close to a hospital, and the patient was rushed to the emergency ward, where he was successfully resuscitated. After stabilization, the patient was transferred to our coronary care unit. EKG study showed ST segment elevation and T wave inversion with poor progression of the R wave in V1-V5. Chest X-ray was within normal limits.

Transthoracic and transesophageal echocardiography with Doppler colour-flow mapping demonstrated the pulmonary origin of the anomalous left coronary artery in the long and short axis views and a retrograde flow jet from the left coronary artery into the pulmonary trunk. There was mild segmental wall motion abnormality in the anteroapical region, with a left ventricular ejection fraction of 50%. Stress thallium scintigraphy showed a fixed lesion in the apex and anterolateral wall and ischemia of the anterior and lateral walls (Fig.1).

Before operation

After operation

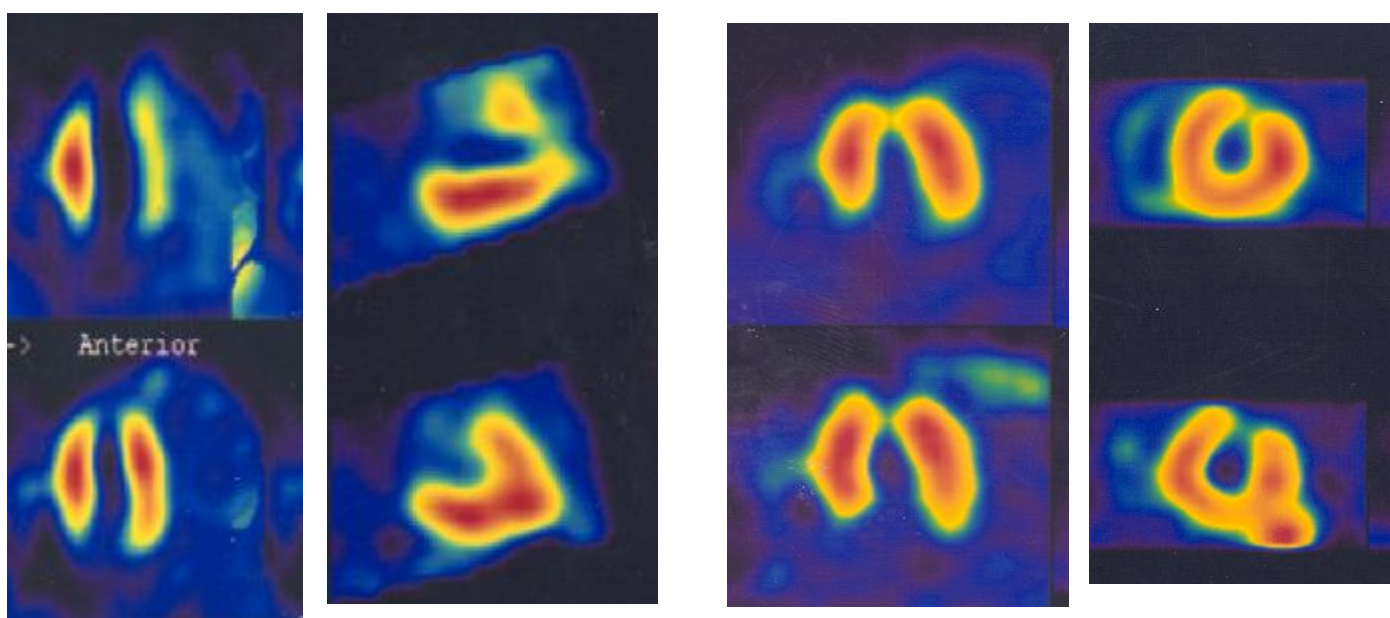


Fig.1. Spect myocardial perfusion scan showed ischemia in the lateral and anterior wall but myocardial infarction in LV apex and basal portion of the anterolateral wall.

Aortography, coronary angiography with left ventriculogram demonstrated the retrograde drainage of the coronary vessel into the pulmonary artery (Fig. 2).

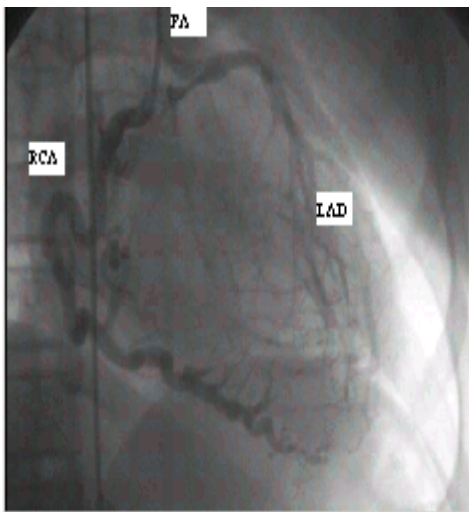
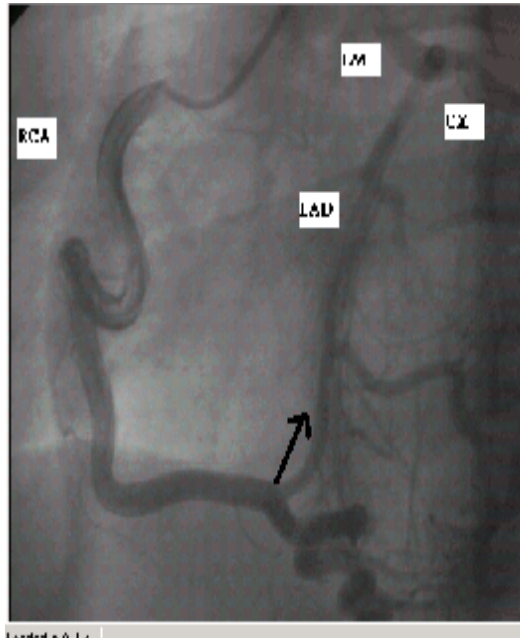


Fig. 2. Coronary angiography demonstrated the retrograde drainage of the coronary vessels into the pulmonary artery.

A few days later, the patient was successfully treated by direct aortic

reimplantation of the left coronary artery under extracorporeal circulation. The postoperative period was uneventful and the patient was discharged on the 7th day after surgery. Transthoracic echocardiography study was performed 5 days after the operation. The origin of the left coronary artery from the aorta was easily seen. One month after the operation, a SPECT myocardial perfusion scan showed no ischemia in the lateral and anterior walls, but a definite myocardial infarction in the left ventricular apex and basal portion of anterolateral wall was detected (Fig. 1).

Discussion

Although structural abnormalities of the coronary arteries other than coronary atherosclerosis are infrequent causes of sudden cardiac death (SCD), the relative risk of SCD may be quite high in specific situations. Non-atherosclerotic coronary artery abnormalities include congenital lesions, coronary artery embolic phenomena, coronary inflammatory diseases like Kawasaki's disease and mechanical abnormalities of coronary arteries. Among the congenital lesions, ALCAPA is relatively common³ and has a high death rate in infancy and early childhood if it is not treated surgically.⁴ Patients who survive to adulthood without surgical intervention are at risk.⁴ Other forms of coronary arteriovenous fistulae are much less frequent and have a low incidence of SCD. The anomalous origin of the left coronary artery from the right or non-coronary aortic sinus of valsalva appears to have an increased risk of SCD^{5,6} particularly during exercise.

When the anomalous artery passes between the aortic and pulmonary artery roots, the take-off angle of the anomalous ostium creates a slit-like opening of the vessel, thus reducing the effective cross-sectional

area of the vessel.⁵ The anomalous origin of the right coronary artery from the left sinus of Valsalva also has been reported in association with SCD;^{5, 6} however, it may not have the same risk as origin of the left coronary from the right sinus of Valsalva. ALCAPA, a rare congenital abnormality of the coronary arteries, is very rarely seen in teenagers. In this particular case, successful resuscitation made diagnosis and early surgical treatment possible.

References

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