

Single Coronary Artery: A Case Report

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ABSTRACT

Right coronary artery (RCA) originating from left coronary sinus of valsalva is a very rare congenital coronary artery anomaly. A 45-year-old woman presented with hypertension, complaints of chest pain and abnormal exercise electrocardiogram (ECG) testing. The coronary angiography was performed. RCA was visualized as anomalously originating from the left coronary sinus of valsalva. In this case report, we present a patient who had a single coronary artery from left sinus of valsalva.

Key Words: Congenital coronary artery anomaly, coronary angiography, single coronary artery.

ÖZET

Tek Koroner Arter: Olgu Sunumu

Sağ koroner arterin sol sinüs valsalvadan köken alması, oldukça nadir bir konjenital koroner arter anomalisidir. Efor anjinasıyla başvuran 45 yaşında hipertansif bir bayan hastada yapılan koroner angiografide; sağ koroner arterin, sol sinüs valsalvadan çıktığı görüldü. Bu yazıda sol sinüs valsalvadan çıkan, tek koroner artere sahip olgu sunulmaktadır.

Anahtar Kelimeler: Konjenital koroner arter anomalisi, koroner anjiyografi, tek koroner arter.

INTRODUCTION

RCA originating from left sinus valsalva is a very rare congenital coronary artery anomaly. Most of these variations appear to be of no clinical significance. In case of classic appearance of RCA was not established during angiography, physician should kept in mind that RCA can stem from left sinus of valsalva.

CASE REPORT

A 45-year-old woman with hypertension presented to the hospital with complaints of chest pain for three months. Her ECG was normal sinus rhythm. Her echocardiography was unremarkable. In her exercise electrocardiogram, ischemic ST segment depression occurred in inferolateral derivations in stage 2. The angiography was performed. Dur-

ing her diagnostic coronary angiogram, multiple attempts to cannulate the RCA with the right Judkins 4.0 cm diagnostic catheter were unsuccessful. We used right amplatz coronary catheter. RCA was visualized as anomalously originating from the left sinus valsalva (Figure 1-2). There were no atherosclerotic lesions. Because of her chest pain and abnormal exercise ECG testing we performed multislice CT to show any compression of RCA between pulmonary artery and the ascending aorta. Multislice CT scan showed; RCA originating from left coronary sinus of valsalva and RCA ran down between the ascending aorta and pulmonary artery (Figure 3). Her chest pain and abnormal exercise ECG testing could be due to the compression of RCA between the ascending aorta and pul-

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monary artery, during exercise. She was discharged home on 1 day without any complication.

Figure 1. Coronary Angiography View of Single Coronary Artery. RCA is Originating From The Left Coronary Sinus of Valsalva.

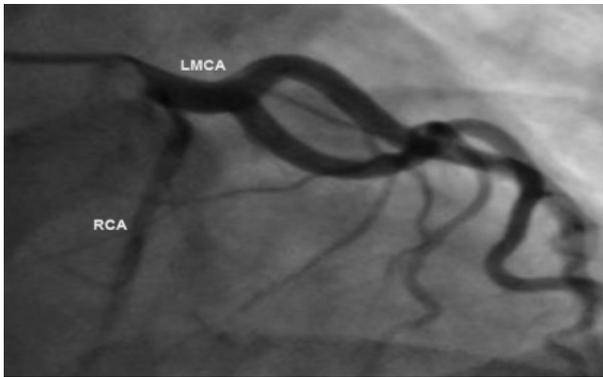


Figure 2. Coronary Angiography View of Single Coronary Artery. RCA is Originating From The Left Coronary Sinus of Valsalva.

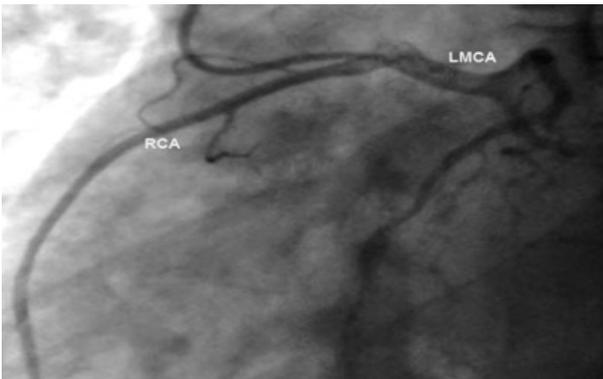
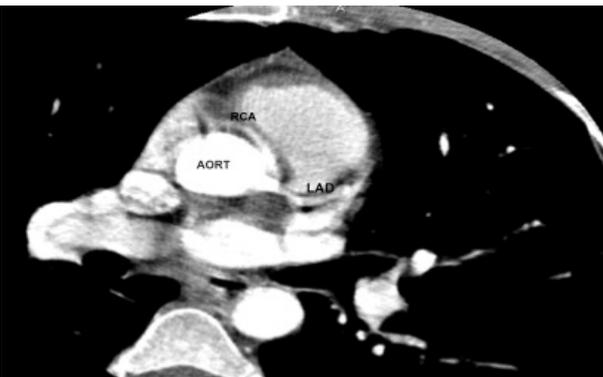


Figure 3. Multislice Computed Tomography Image of Single Coronary Artery.



DISCUSSION

In early fetal development, the primitive loosely packed myocardium is nourished via sinusoids, which communicate with the heart cavities. As the myocardium be-

comes more compact, the sinusoids disappear and give rise to a network of veins, arteries, and capillaries (at approximately 32 days of gestation) that may have connections with other mediastinal vessels. Persistence of these connections may lead to coronary artery fistulae. As the coronary artery network evolves, endothelial buds arise from the base of the truncus arteriosus. It is still unknown if initially there are only two buds, or buds from each potential cusp of the aortic and pulmonary sinuses (six buds) with later involution of all but two buds. These buds later grow and join the coronary artery network that develops from the sinusoids to establish the definitive coronary artery system. Abnormal involution (in the case of six initial buds), bud position or septation of the truncus arteriosus may lead to the development of an abnormal origin of the coronary arteries.

Given this complex embryology, it is expected that deviations in development may result in various ("abnormal") origins of the coronary arteries from the normal sinuses of Valsalva in the aorta or from the pulmonary artery. Some of these variations may have no clinical importance while others are clearly pathologic (1). These variations can be associated with underlying congenital heart defects (2)

Separate origins of the RCA and its conal branch occur in 50 percent of the population and separate origins of the left circumflex coronary artery (Cx) and left anterior descending artery (LAD) in 1 percent.

More important lesions include origin of the left main coronary artery or LAD from the right sinus of Valsalva or RCA. The subsequent course between the aorta and pulmonary artery to the left ventricle may result in compression of the vessel, myocardial ischemia, and sudden death in both adults and teenagers (3). Alternatively, it may be the intramural course and acute angle of takeoff which may predispose to obstruction to blood flow (3). These complications commonly occur during or immediately after exercise. Exercise leads to expansion of the aortic root and pulmonary trunk, which, in addition to external coronary artery expression, may increase the preexisting angulation of the coronary artery takeoff, reducing the luminal diameter in the proximal portion of the coronary artery (3).

The incidence of abnormal aortic origin of the coronary arteries is low with reported values of approximately 0.64 percent of births and 0.17 percent in asymptomatic children and adolescents who were referred for and underwent echocardiography (4). The most common anomaly is the Cx from the right sinus of Valsalva, followed by a single coronary artery from the left sinus of Valsalva, both coronary arteries from the right sinus of Valsalva, and the LAD from the right sinus of Valsalva. Right coronary artery from the left coronary sinus is found in only about 0.03–0.9% of patients undergoing coronary angiography. In otherwise normal patients, there may be

variations in the number, shape, and location of the ostia or origins of the coronary arteries. Most of these variations appear to be of no clinical significance although a high origin of the ostia may reduce diastolic coronary artery blood flow (1,2). Some of these variations may have no clinical importance while others are clearly pathologic. The clinical presentation of a patient with the above mentioned abnormalities may be anginal chest pain, or syncope, especially with exercise. Unfortunately, the first clinical symptom may be sudden death, particularly in young athletes and military recruits (6). In a registry of sudden death in 286 competitive athletes under age 35 in whom cardiovascular disease was shown to be the cause at autopsy, an anomalous coronary artery of wrong sinus origin was responsible for 13 percent of cases, being second in frequency to hypertrophic cardiomyopathy (5). In a series of autopsies in military recruits, an anomalous coronary artery was the most frequent cause of sudden cardiac death (6) However, there is still controversy concerning the mechanism by which the interarterial course is compressed between the aorta and pulmonary artery. An intravascular ultrasound study found that luminal compression of the coronary artery was totally attributable to the aorta because the pressure of the pulmonary artery was much lower than that of the aorta.

Multislice CT with its cross-sectional imaging capability is a viable noninvasive modality for delineating coronary artery anomalies, particularly if findings at coronary angiography are equivocal. It also shows compression of coronary arteries between aorta and pulmonary artery. Multislice CT is rapidly emerging as a credible alternative for the visualization of coronary anomalies.

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