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## CASE REPORT

# ANOMALOUS ORIGIN OF THE RIGHT CORONARY ARTERY FROM THE LEFT SINUS OF VALSALVA ACCOMPANIED BY BICUSPID AORTIC VALVE IN AN ELDERLY PATIENT

## ABSTRACT

Anomalous origin of the right coronary artery (RCA) from the left sinus of Valsalva is a rare coronary artery anomaly, and although it is usually asymptomatic, it may lead to angina pectoris, myocardial infarction or sudden death especially in young individuals. Coexistence of this coronary anomaly with bicuspid aortic valve is extremely rare. A 80-year-old female patient was presented to the cardiology department with the complaint of chest pain unrelated to physical exercise which started one week ago. Electrocardiogram revealed sinus rhythm and T wave negativity through the leads V1-V3. Transthoracic echocardiogram revealed a calcified bicuspid aortic valve with mild regurgitation. Multislice cardiac computed tomography demonstrated that the RCA arose from the left sinus of Valsalva and there were calcified non-obstructive plaques in each of the coronary arteries. Absence of exercise induced chest pain or documented ischemia together with the advanced age of the patient suggested that this congenital coronary anomaly was not responsible for the clinical condition.

**Key Words:** Coronary Vessel Anomalies; Aortic Valve; Tomography.



## OLGU SUNUMU

# YAŞLI BİR HASTADA BİKÜSPİD AORT KAPAĞININ EŞLİK ETTİĞİ SOL SİNÜS VALSALVADAN ÇIKAN SAĞ KORONER ARTER ANOMALİSİ

## Öz

Sağ koroner arterin (SKA) sol sinüs valsalvadan çıkış anomalisi nadir bir koroner arter anomalisi olup genellikle asemptomatiktir; fakat özellikle genç hastalarda göğüs ağrısı, miyokart enfarktüsü ya da ani ölüme neden olabilir. Bu koroner anomali ile biküspid aort kapağının birlikteliği oldukça nadirdir. Seksen yaşında bayan hasta bir hafta önce başlayan egzersiz ile ilişkisiz göğüs ağrısı şikayeti ile kardiyoloji polikliniğimize başvurdu. Elektrokardiyografisi sinüs ritminde idi ve V1 -V3 derivasyonlarında T dalga negatifliği mevcuttu. Transtorasik ekokardiyografide kalsifiye biküspid aort kapağı ve hafif aort yetmezliği tespit edildi. Çok kesitli kardiyak bilgisayarlı tomografide SKA'nın sol sinüs valsalvadan çıktığı ve tüm koroner arterlerde anlamlı tıkanıklığa neden olmayan kalsifiye plaklar saptandı. Hastanın göğüs ağrısının egzersiz ile ilişkili olmaması, dokümente iskemisinin olmaması ve yaşının ileri olması nedeniyle bu koroner anomalinin mevcut klinik durum ile ilişkili olmadığı düşünüldü.

**Anahtar Sözcükler:** Koroner Damar Anomalileri; Aort Kapağı; Tomografi.

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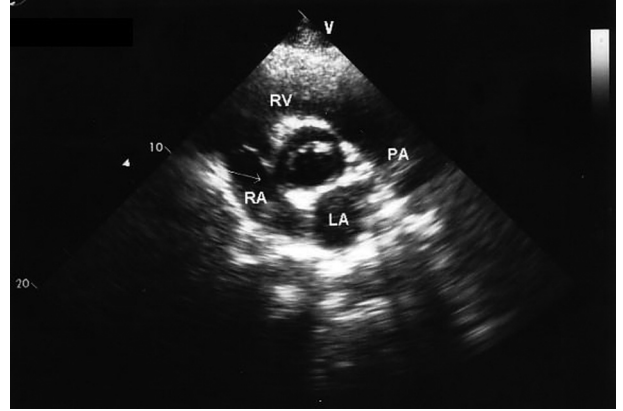


## INTRODUCTION

The bicuspid aortic valve is the most common congenital cardiac anomaly, affecting 1% to 2% of the population (1). The bicuspid aortic valve may function normally throughout life, may develop progressive calcification and stenosis or may develop regurgitation. Anomalous origin of the right coronary artery (RCA) from the left sinus of Valsalva is a rare coronary artery anomaly with an incidence of 0.2 % to 0.5 % in patients undergoing coronary angiography (2-3). Its association with a bicuspid aortic valve is extremely rare with only a few cases having been reported previously (4-5). We present a case of anomalous origin of the RCA from the left sinus of Valsalva associated with bicuspid aortic valve.

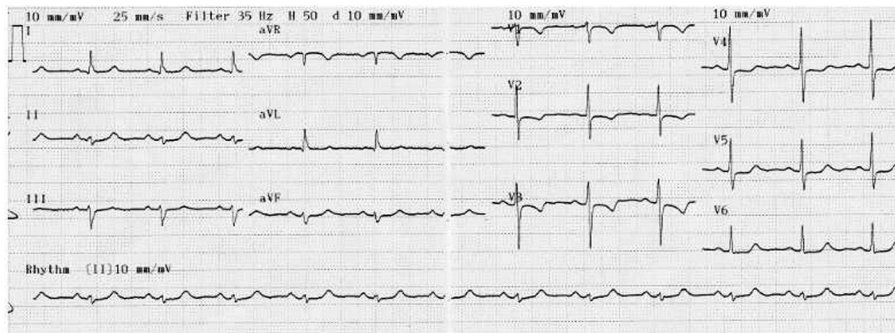
## CASE

An 80-year-old female patient was presented to the cardiology department with chest pain unrelated to physical exercise that started one week ago. She had advanced age and hypertension as coronary risk factors. Her blood pressure had been regulated with 10 mg of amlodipin for ten years. The twelve-lead electrocardiogram revealed sinus rhythm and T wave negativity through the leads V1-V3 (Figure 1). On physical examination her blood pressure was 130/80 mmHg and pulse rate was 70 bpm. On cardiac auscultation a grade 3/6 systolic ejection murmur could be heard at the aortic area. Transthoracic echocardiogram detected a calcified bicuspid aortic valve with mild regurgitation (Figure 2). Aortic velocity was 1,8 m/s. Significant gradient was not present on the aortic valve and aortic root diameter was 35 mm. There wasn't any left ventricular segmentary wall motion anomaly. The patient could not perform a treadmill exercise test because

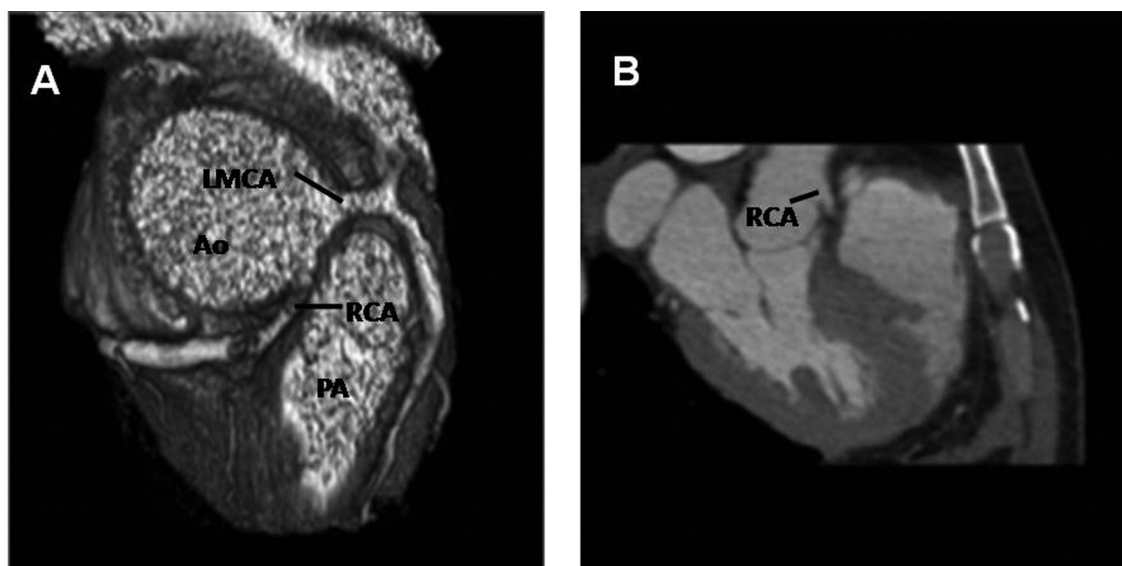
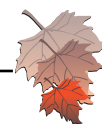


**Figure 2—** The arrow indicates a calcified bicuspid aortic valve on transthoracic echocardiography. LA, left atrium; RA, right atrium; RV, right ventricle; PA, pulmonary artery.

of severe bilateral degenerative osteoarthritis of the knees. Therefore a dipyridamole nuclear scintigraphic stress testing was planned. However, headache, nausea and flushing occurred after dipyridamole administration and the test was cancelled. We decided to continue diagnostic work-out with multislice cardiac computed tomography. Multislice cardiac computed tomography revealed calcified non-obstructive coronary plaques and abnormal origin of the RCA from the left sinus of Valsalva which coursed between the ascending aorta and the pulmonary artery (Figure 3A). On a coronal image, there was a normal RCA orifice and no acute angle take-off of the RCA from the aorta (Figure 3B). Absence of exercise induced chest pain or documented ischemia together with the advanced age of patient suggested that this congenital coronary anomaly was not responsible for the clinical condition. We started medical therapy with acetylsalicylic acid and statin.



**Figure 1—** ECG revealing T wave negativity in leads V1 through V3 at admission.



**Figure 3—** Volume rendering image (A) showing the RCA originating from the left sinus of Valsalva and coursing between the ascending aorta (Ao) and the pulmonary artery (PA). Coronal image (B) showing a normal orifice and no acute angle take-off from the aorta. RCA, right coronary artery; LMCA, left main coronary artery.

## DISCUSSION

Anomalous origin of the RCA from the left sinus of Valsalva is usually asymptomatic however, it may cause angina pectoris, myocardial infarction or sudden death especially among young individuals (6). Pathophysiological mechanisms of myocardial ischemia and sudden death have not been clarified exactly. Several theories have been suggested to explain the possible pathophysiology of restricted blood flow. These include; i) intramural course of the proximal portion of the RCA within the aortic wall, ii) compression of the proximal RCA by the great arteries during exercise, iii) a slit-like RCA orifice and the acute angle take-off ( $<30^\circ$ ) of the RCA from the aorta, iv) coronary spasm especially in the proximal portion of the RCA (7-8). In our case, RCA had an interarterial course but patient didn't suffer from exertional pain. No significant coronary artery stenosis was present angiographically, also RCA had no acute angle take-off and intramural course as well. Therefore we didn't consider the chest pain as angina pectoris. However, we can't eliminate coronary ischemia completely as we weren't able to perform physical and pharmacologic stress tests and didn't rule out coronary vasospasm.

Conventional coronary angiography is usually inadequate in the evaluation of the coronary artery anomalies because it has a relatively low cannulation rate, and is limited with respect to multi-planar image reconstruction. Multislice cardiac com-

puted tomography (MSCT) together with MRI, are the best imaging methods in the diagnosis of coronary anomalies. In our patient, MSCT demonstrated that the RCA arose from the left sinus of Valsalva separately from the left main coronary artery and coursed between the ascending aorta and the pulmonary artery. There was a normal orifice with no acute angle take-off of the RCA from the aorta. In addition, no significant coronary artery disease was detected.

Treatment of patients with RCA arising from the left sinus Valsalva which has an interarterial course is still controversial, as RCA origin anomalies are usually benign and they are associated with low sudden death risk especially in elders. Pelliccia reported that surgery is indicated in young ( $<35$  years) symptomatic patients but there is no consensus on therapeutic approach in asymptomatic patients as surgery is not needed in incidentally diagnosed adult and elderly patients without inducible ischemia (9). However, the risk cannot be properly estimated, therapeutic options should be evaluated in terms of patient's clinical features. Accordingly, our opinion is inclined towards surgical treatment in young patients with documented ischemia and significant luminal narrowing detected by imaging techniques with or without symptoms. Our patient had an advanced age and as there was neither significant luminal narrowing, nor documented ischemia, we didn't consider surgical treatment.



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