

### Single coronary artery with retroaortic course. An unusual origin of right Valsalva sinus

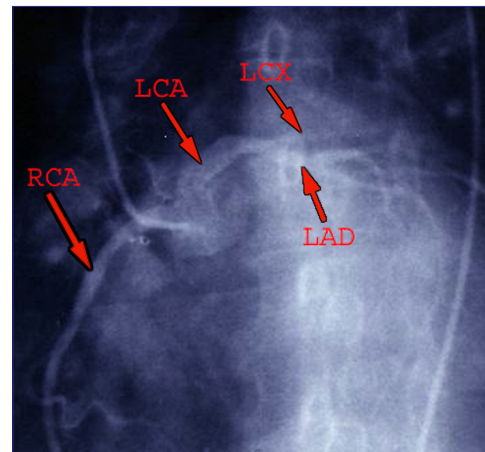
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Branches of the coronary arteries may vary in origin, distribution, number, and size. Congenital anomalies of the coronary arteries occur in 0.2-1.2% of the general population.<sup>1</sup> Most coronary artery anomalies do not cause myocardial ischemia and are often found incidentally during angiographic evaluation for other cardiac diseases. These pathologic anomalies may be present from early infancy and can result in angina, congestive heart failure, myocardial infarction, cardiomyopathy, ventricular aneurysms, or sudden death. Anatomical anomalies of the coronary arteries may lead to incorrect diagnosis of vascular insufficiency. In emergency situations, such a mistake may give rise to inappropriate decisions concerning further therapy. Coronary anomalies may also contribute to atypical presentations of myocardial infarction on echocardiography.

Normal and anomalous coronary arteries have been classified by various criteria. The system proposed by Angelini<sup>1</sup> in 1989 includes nomenclature, and definitions of both normal variations in coronary arteries and anomalous coronary arteries. A consensus report by the Society of Thoracic Surgeons–Congenital Heart Surgery Database Committee uses the following nomenclature to define coronary artery anomalies: 1. anomalous pulmonary origins of the coronaries, 2. anomalous aortic origins of the coronaries, 3. congenital atresia of the left main coronary artery, 4. coronary arteriovenous fistulae, 5. coronary artery bridging, 6. coronary artery aneurysms, and 7. coronary stenosis.<sup>2</sup>

Single coronary arteries (SCA) subtype R (right) or L (left), group I-II-III, A (anterior) or P (posterior) constitute single coronary arteries with an anterior or posterior route to the aorta and can produce myocardial ischemia,<sup>3</sup> in the authors' experience various degrees of myocardial ischemia may be observed when the SCA becomes insufficient to support the total myocardial burden. In addition, abnormalities of the course of coronary vessels may also cause problems in cases of emergency treatment.

A 42-year-old woman with stable angina was presented to the Cardiac Catheterization Center, Cardiology Department, Dicle University, Turkey.



**Figure 1** - Coronary angiogram in the 30-degree right anterior oblique position, showing single coronary artery with retroaortic course giving rise to all 3 epicardial vessels. RCA - right coronary artery; LCA - left coronary artery; LAD - left anterior descending artery; LCX - left circumflex artery.

The patient had a history of chest pain on exertion and dyspnea occurring over 3-4 months. The pain was located on the left side of her chest with radiation to the left arm. Occasionally, the patient had sweating, stable angina and syncope. Physical exam, baseline electrocardiogram, electrocardiogram Holter, and x-ray results were normal. But, treadmill (Electrocardiogram) test was positive. Coronary angiography was subsequently accomplished utilizing a 6F Judkins catheter to cannulate a single, ectopic ostium. In result, it showed a single coronary artery, and there was no evidence of any coronary stenosis. The single coronary artery arose at the level of the right sinus of Valsalva with a retroaortic course (**Figure 1**). The artery then divided into a left and right coronary artery. The branches had a normal terminal distribution. The patient was discharged from the hospital after administration of verapamil, atorvastatin and aspirin.

Angiographic recognition of anomalies of the coronary tree is important for appropriate diagnosis and management of patients with atherosclerotic coronary diseases and in those undergoing open heart surgery. Failure to identify these anomalies can lead to inadequate and prolonged procedures which can result in catastrophic complications. Single coronary artery may occur with (41%) or without (59%) associated congenital anomalies.<sup>3</sup> Lipton et al<sup>3</sup> categorized numerous variations based on the site of origin (right or left coronary cusp), number of branching vessels, and course in regards to the ascending aorta and pulmonary outflow tract. Harikrishnan et

## Clinical Notes

al<sup>4</sup> reported a SCA in 3 of the 7400 patients, which included one case of postmyocardial infarction ventricular septal rupture with triple-vessel disease, and another with 2 small coronary fistulae. One case with each of the following coronary anomalies was found. Furthermore, Rigatelli et al<sup>5</sup> examined various degrees of myocardial ischemia observed when the SCA becomes insufficient to support the myocardial demand. In his series, single coronary arteries were of the R-II subtype, except for one, all had a benign prognosis. Single coronary arteries of the L II-III B subtypes are very rare condition in which the coronary circulation is totally supported by an anomalous right coronary artery originating from a normal left coronary artery, and usually passing between the pulmonary artery and aorta constituting a potential risk.

We report a case of a SCA originated from the right sinus of Valsalva with a retroaortic course. After a short course, this coronary artery was divided into left and right coronary arteries. The branches of the left and right coronary artery were compatible with a normal course of coronary arteries. This SCA is typed using the Lipton classification scheme.<sup>3</sup> The patient had a R III-P type of SCA.

In conclusion, a SCA anomaly is a relatively uncommon congenital anomaly. Timely clinical identification of a SCA anomaly is crucial as it may be amenable to surgical treatment. Indeed, surgery seems reasonable in any young person, particularly if symptomatic, but also if asymptomatic with evidence of myocardial ischemia. In our case, we demonstrated a case of myocardial ischemia, which may be a result of microvascular disease in a patient with a single coronary orifice in the right sinus of

Valsalva and a retroaortic course of a single coronary artery. On the other hand, clinicians performing coronary angiography should be aware of this type of anatomy.

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