

# SINGLE CORONARY ARTERY ORIGINATING FROM THE RIGHT SINUS OF VALSALVA

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Tek koroner arter, nadir görülen bir koroner arter anomalisidir. Sol ana koroner arter ve sağ koroner arterin, sağ koroner sinüsten aynı trunkustan çıktığı bir vaka sunulmaktadır. Hastaya koroner anjiyografi ve sonrasında sol ana koroner arterin seyri görmek amacıyla çok kesitli bilgisayarlı tomografi (ÇKBT) uygulandı. ÇKBT de sol ana koroner arterin sağ ventriküler infundibulum ön yüzünde seyrettiği görüldü. Lipton sınıflandırmasına göre vakamız RIIA grubundaydı. Klinik önem, temel olarak anormal arterin gidişatı ile belirlenir.

## INTRODUCTION

Single coronary artery is a rare coronary artery abnormality. There is only one coronary artery arises from the aortic trunk by a single coronary ostium, supplying the entire heart. It occurs in approximately 0.024 % 1 of the population. We present a patient in whom the LMCA and RCA originated from same trunkus in the right coronary sinus.

## CASE REPORT

A 67-year-old female with history of rheumatoid arthritis, moderate aortic stenoses and hypertension, was complaining occasionally retrosternal pressure-like chest discomfort on exertion. Family history and other risk factors of coronary artery disease were not present. She was under hydroxychloroquine and ACE inhibitor therapy. The patient's initial physical examination and laboratory results showed no abnormality. The electrocardiogram was normal. She underwent treadmill exercise test which was positive at stage 3 of the Bruce protocol. In echocardiographic evaluation, she had moderate aortic stenosis with aortic valve calcifi-

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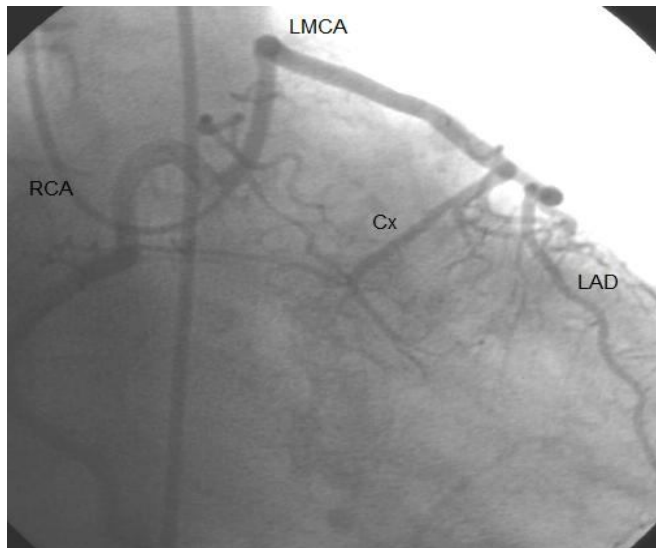
Ön yüz seyri benign olarak kabul edilir. İnterarteriyel tipin en kötü prognoza sahip olduğu bilinmektedir. Hastanın antiiskemik tedavi ile asemptomatik olması, göreceli olarak benign bir prognozunun olmasından dolayı vakamızda medikal tedavi tercih edildi.

**Anahtar kelimeler:** Tek koroner arter, Koroner anomali

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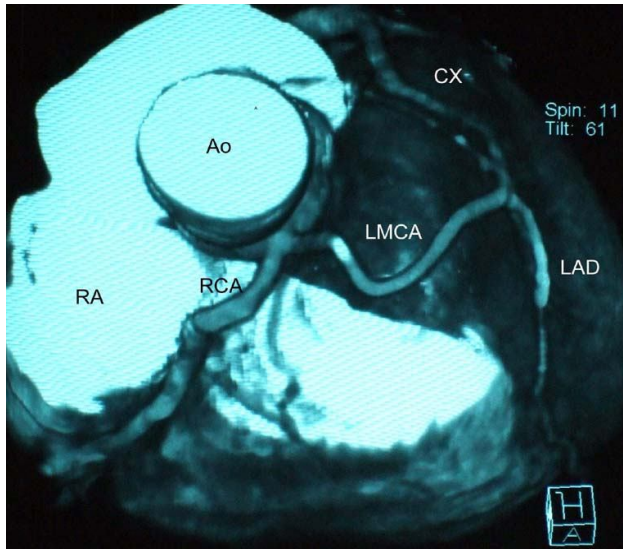
cation, left ventricular dimensions and ejection fraction were normal. Coronary angiography was subsequently performed which showed a single origin of the coronary artery in the right coronary sinus. There was 80% stenosis in distal left anterior descending artery (LAD). The circumflex artery (Cx), RCA and left ventriculography was normal (Figure 1). Multislice computerized

**Figure 1:** Coronary angiography (RAO view) demonstrates a single coronary artery arising from right sinus of Valsalva. LMCA, left main coronary artery; LAD, left anterior descendan artery; Cx, circumflex coronary artery; RCA, right coronary artery



**Figure 2:** 16-detector coronary multislice computed tomography angiography shows a single coronary artery from the right sinus of Valsalva, the left main coronary artery passing anterior to the pulmonary artery.

Ao, aort; RA, right atrium; LMCA, left main coronary artery; LAD, left anterior descendan artery; Cx, circumflex coronary artery; RCA, right coronary artery



tomography (MSCT) was performed to show the course of left main coronary artery. MSCT showed that LMCA originated from the right coronary artery, in the right coronary sinus. LMCA was passing anterior to the right ventricular infundibulum (Figure 2). According to Lipton classification 1, this case was group RIIA. Because the patient was asymptomatic on antiischemic medication and had a proposed relative benign course, we recommended medical treatment and the patient has been in fine condition up to now (3 years after angiography).

## DISCUSSION

Coronary artery anomalies are uncommon. Among these, a single coronary artery is a very rare anomaly, 1.5% of the coronary anomalies. Ectopic origin of LMCA from the right sinus of Valsalva or the RCA has been described with a frequency of 0.05 to 0.19% in angiographic studies<sup>2</sup>.

In 1979 Lipton et al<sup>1</sup>. proposed a useful angiographic classification for single coronary artery. In this classification, in group RII, there is a single right coronary artery. The right coronary and its posterior descending and posterior left ventricular branches are normal. Left coronary artery originates from the proximal RCA. Group R IIA, like our case, LMCA passes anterior to the right ventricular infundibulum and gives off the LAD and Cx as it crosses the ante-

rior interventricular groove. In the right anterior oblique view (RAO), the LMCA and the initial portion of the Cx will form an ellipse (eye). The LMCA forms the upper portion of the ellipse, and the Cx forms the lower portion<sup>3</sup>.

Coronary artery anomalies may present with symptoms that include angina, syncope and shortness of breath. There may be more severe presentations like that myocardial infarction, congestive heart failure or sudden death. Symptoms are present in approximately 1/3 of patients. Although single coronary artery seems benign, it can be associated with sudden death. Cheitlin et al<sup>4</sup>. reviewed 51 such cases from the Armed Forces Institute of Pathology series. Only cases with the left coronary artery arising as a single or double vessel from the anterior sinus of Valsalva, where the left coronary artery passes leftward and posteriorly between the aorta and the pulmonary artery, are associated with sudden death. They reported that where the left coronary artery does not pass acutely posterior and leftward between the pulmonary artery and the aorta there is no risk of sudden death<sup>4</sup>.

Various mechanisms have been postulated to explain the occurrence of ischemia or sudden death in these patients. Concomitant atherosclerotic stenosis is possible cause of ischemia but in patients with non-stenotic single coronary arteries, mechanism of myocardial ischemia is not well understood. Sudden death is particularly common when the left coronary artery courses between the aorta and pulmonary trunk. Expansion of the aortic and pulmonary roots during systole could cause mechanical compression of the LMCA. This may cause acute ischemia or ventricular fibrillation. The other hypothesis is that kinking of the LMCA at its origin from the RCA by an increased angulation caused by the distension of the aorta during exercise. Other mechanisms such as coronary spasm and hypoplasia are also possible<sup>5</sup>.

The clinical significance is mainly determined by the course of the anomalous artery. Clinical events related to the anomalous left coronary artery have usually been reported when the anomalously arising artery passes between aorta and pulmonary trunk. The anterior and posterior courses have been considered to be clinically insignificant<sup>6</sup>. Type R IIA, like our case, the left coronary artery passing anterior to the pulmonary artery is almost completely benign, and reported sudden death is extremely rare<sup>7</sup>.

The golden standart diagnostic method is coronary angiography. Nevertheless, it is important to define the course of the left coronary artery. Therefore, additional imaging techniques, like multislice

computer tomography (MSCT) or magnetic resonance imaging are necessary to confirm<sup>8</sup>.

Treatment is still controversial. Reversible ischemia in the distribution of the anomalously originating coronary artery is considered an indication for operation. Cohen et al. reported that cases of interarterial type recommended operation in patients less than 30 years of age because of the high incidence of sudden death<sup>9</sup>. Due to the anterior course of the left coronary artery, this case was treated by medical treatment.

In summary, reports of patients in whom single coronary artery arises from the right sinus of valsalva is rare. Our patient represents a case of single coronary artery originating from the right sinus of valsalva with a left coronary artery course anterior to the right ventricular infundibulum, using both visualisation methods, coronary angiography and 16-detector row gated CT angiography. This case demonstrates the complementarity of both imaging methods in determining diagnosis and therapy.

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