

# Twin Circumflex Artery: A Rare Coronary Artery Anomaly

## İkiz Sirkumfleks Arter: Nadir Bir Koroner Anomali

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### Abstract

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A circumflex coronary artery anomalously originating from the right sinus of Valsalva is the most common coronary anomaly; however dual origin of the circumflex artery is a rare anomaly. We describe here the report of 'twin' circumflex arteries with the anomalous circumflex coronary artery arising from the right coronary sinus and a circumflex artery from left coronary artery.

**Keywords:** Coronary artery anomalies, twin circumflex arteries, right sinus of Valsalva

### Özet

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Sağ sinüs valsavadan kaynaklanan sirkumfleks koroner arter anomalisi en sık görülen koroner arter anomalisiyken, sirkumfleks arterin çift olması nadir bir anomalidir. Burada sağ koroner sinüsten çıkan sirkumfleks arter ile sol koroner arterden çıkan sirkumfleks arterin oluşturduğu ikiz sirkumfleks arter anomalisini tanımladık.

**Anahtar Kelimeler:** Koroner arter anomalisi, ikiz sirkumfleks arter, sağ sinüs Valsalva

### Introduction:

Coronary artery anomalies (CAA) are rare angiographic findings. The incidence of CAA is about 1-2% in angiographic studies of the adult population.<sup>1</sup> There are four common courses for the anomalously arising left coronary artery (LCA) from the right sinus of Valsalva (RSV), one common course for the right coronary artery (RCA) anomalously arising from left sinus of Valsalva (LSV), and one common course for the circumflex coronary artery (Cx), arising anomalously from RSV.<sup>2</sup> Although anomalously originating Cx from the RSV is the most common coronary anomaly, this anomaly is thought to be of little clinical significance unless the vessel is severely narrowed.<sup>3</sup> Herein, we present a case of twin Cx arteries originating from the left main and right coronary sinus, respectively.

### Case

A 44-year old male patient was admitted to our hospital with chest pain. He was asymptomatic to this day. He had no history of coronary artery disease, and alcohol or drug use. The only risk factor for atherosclerosis was smoking. The electrocardiogram showed ST-segment elevation in leads V1-V6 and ST-segment depression in the inferior leads (Figure 1). The patient was hospitalized with the diagnosis of acute anterior myocardial infarction. Findings of physical examination and blood tests were unremarkable except for moderate increases in cardiac enzymes. The bedside echocardiography revealed a normal left ventricular systolic function, normal cardiac valves functions, mild anterior wall hypokinesia were noted. The patient was transferred to our catheterization laboratory for primary percutaneous coronary intervention. Left coronary angiography revealed no significant stenosis of the left Cx artery, however the proximal segment of the left anterior descending artery (LAD) was totally occluded by a thrombus (Figure 2A). Surprisingly, right coronary angiogram showed an additional Cx artery and a right coronary artery arising separately from the right sinus of Valsalva. Both of them had non obstructive plaques (Figure 3A-3B). The right coronary artery (RCA) was non-dominant. Primary percutaneous coronary intervention including balloon angioplasty and stenting was successfully performed for the LAD lesion (Figure 2B). The post-interventional period was uneventful, and the patient was followed up for 4 days at the intensive care unit and discharged without any complications.

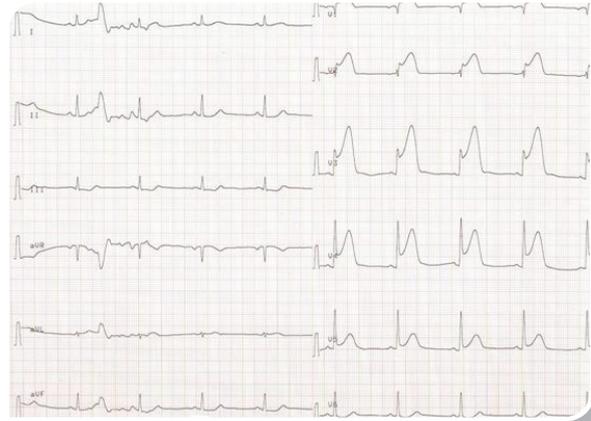


Figure 1: Initial 12-lead electrocardiogram performed in the emergency department. ST-segment elevation in leads V1-V6 and ST-segment depression in the inferior leads.

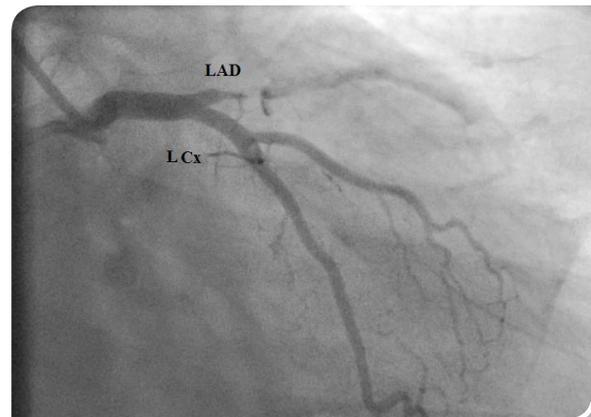


Figure 2A: A thrombotic total occlusion of the left anterior descending (LAD) artery in the right caudal view

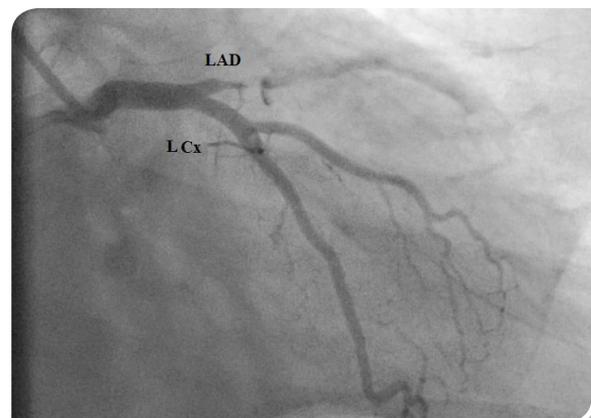


Figure 2B: After stent implantation in the left anterior descending (LAD) artery in the left oblique view.

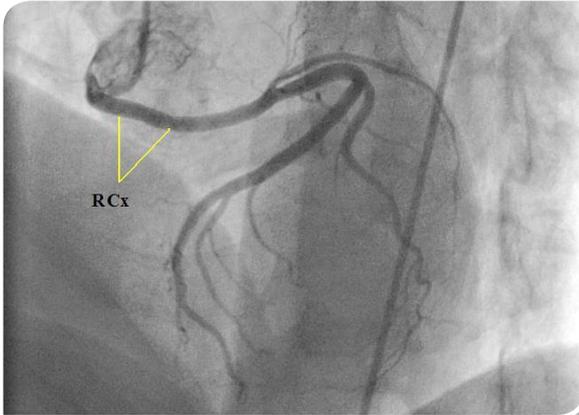


Figure 3A: Left anterior oblique (LAO) cranial projection. Right circumflex artery (RCx) arising from a separate ostium in the right sinus of Valsalva

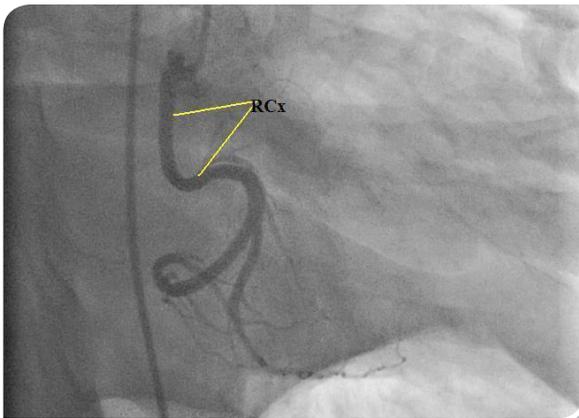


Figure 3B: Right anterior oblique (RAO) caudal projection. Showing the right circumflex artery (RCx) arising from a separate ostium in the right sinus of Valsalva.

## Discussion

Many coronary anomalies are clinically silent and are incidentally recognized during routine coronary angiography. The percentage of symptoms including life threatening arrhythmias, syncope, myocardial infarction, or sudden death was 20% in all patients with CAA. The %80 of patients have benign course.<sup>4</sup> Rarely, the LMCA, LAD and RCA may take origin from the pulmonary artery. These anomalies resulting in death during childhood, in about 90% of these patients.<sup>5</sup> The other anomalies with clinical importance are the LMCA or

LAD arising from the right coronary sinus of Valsalva and RCA originating from the left coronary sinus of Valsalva, which can lead to sudden cardiac death. The %60 percentage of patients<sup>6</sup> with the anomalous origin of the LMCA or LAD from the right coronary sinus of Valsalva, has interarterial course and these patients suffer from angina and premature cardiac death.<sup>7,8</sup> The pressure increase in pulmonary trunk or aorta during exercise in addition to acute take off or slit-like orifices of these arteries, produces ischemia.

The most common anomaly include a separate origin of the LAD and Cx arteries from the left sinus of Valsalva, followed by a Cx artery arising from the right sinus of Valsalva or the RCA.<sup>9</sup> Although there have been several cases of dual origin of a Cx artery,<sup>10,11</sup> Cx artery arising from the main stem with an anomalous Cx artery originating from a separate ostium in the right sinus of Valsalva, has not been reported to date. The importance of these anomaly can emerge in clinical state of acute coronary syndrome related with these arteries.

The most important problem in diagnosing twin Cx arteries is the separate origin of the two Cx arteries from different ostia on the left and right aortic sinus of Valsalva.

## Conclusions

Twin Cx arteries represent a very rare congenital anomaly. In the absence of significant stenosis in the normal left Cx, an anomalous Cx arising from RCA should be suspected in a patient with acute inferior or posterior MI. However, our case was not represented with an AMI in anomalous LCX with inferior or posterior MI. This case is an anterior AMI with an incidental anomalous of LCX. Thus, the angiographer must always keep in mind this possibility.

In conclusion, the diagnosis of coronary artery anomalies is often incidentally, but especially some CAA could lead to angina, syncope, congestive heart failure, arrhythmias and sudden death, by producing ischemia, thus the diagnosis and treatment of these pathologies is very important. The clue of diagnosis is clinical suspicion, which can promote with awareness and familiarity of coronary artery anomalies.

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