

# A rare coronary anomaly: the right coronary artery originating from the left anterior descending artery

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## ABSTRACT

Coronary artery anomalies are structural variations which are usually detected incidentally as a result of coronary angiographies. Clinically, they are usually asymptomatic. The prevalence of the coronary anomalies was detected to be 1.3% in patients undergoing coronary angiography. Among coronary artery anomalies; the anomaly in which all coronary arteries are originating from a single coronary is called the single coronary artery (SCA). Among the single coronary artery anomalies; the right coronary artery (RCA) originating from the left anterior descending artery (LAD) is an even rarer condition with a rate around 0.009%. In this anomaly, while the RCA usually originates from the left main coronary artery (LMCA), it may also rarely be seen as a branch of the LAD.

**Keywords:** Coronary anomaly, right coronary artery, anjiography

## INTRODUCTION

Coronary artery anomalies are structural variations that are usually detected incidentally as a result of coronary angiographies. Clinically, they are generally asymptomatic. The prevalence of coronary anomalies was seen to be 1.3% in patients undergoing coronary angiography.<sup>1,2</sup> Among coronary artery anomalies, the anomaly in which all coronary arteries originate from a single coronary is called the single coronary artery (SCA). Among the single coronary artery anomalies, the right coronary artery (RCA) arising from the left anterior descending artery (LAD) is an even rarer condition with a rate of around 0.009%. In this anomaly, while the RCA usually originates from the left main coronary artery (LMCA), it may also rarely be seen as a branch of the LAD.<sup>3,4</sup>

## CASE

A 46-year-old male patient presented with chest pain and was referred to our hospital due to elevated troponin levels. Chest pain is typical, and the patient applied to the hospital in the 5<sup>th</sup> hour of the pain. The patient had no known history of chronic disease. The patient had no familial history of coronary artery disease (CAD) or sudden cardiac death. Smoking was the only risk factor for CAD. In the physical examination, the patient's vital signs were typical, with no anomalies in the electrocardiography. In the coronary angiography performed via the left radial artery, the left main coronary artery (LMCA) was observed to be expected, and the right coronary artery (RCA) was observed to originate

from the left anterior descending artery after the first septal artery (S1) (**Figure 1**). A 50-60% stenosis was observed in the LAD at the level from which RCA arises, a stenosis of 70% in the distal section of the LAD, and a stenosis of 60% in the first diagonal (D1) artery. A stenosis of 99% was observed at the circumflex artery (CX)-OM1 level. A stenosis of 60% was observed in the RCA trunk. The lesion in the CX artery was considered the culprit lesion. Primary percutaneous coronary intervention (PCI) was decided to be performed for CX and operation for the other coronary arteries. A drug-eluting stent (DES) with a size of 2.25x18 mm was implanted in the lesion in the CX artery. Coronary CT angiography was taken to evaluate the course of the coronary arteries. No artery was originating from the right coronary cusp (**Figure 2**). During the follow-up, the patient had no active complaint with a stable general status and was discharged with recommendations for operation.

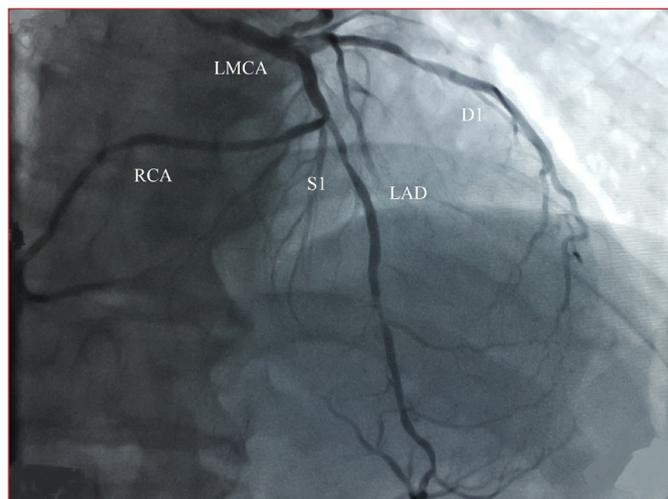
## DISCUSSION

The coronary anomaly in which the RCA originates from the LAD is extremely rare. When it does, it is usually from the proximal LAD, which was the case in our patient.<sup>3,4</sup> The RCA has two courses after arising from the LAD. In one of them, it courses through the posterior side of the aorta; in the other, it runs through the anterior side of the pulmonary artery.<sup>3-5</sup> While there have been 2 cases in which the RCA has a retro-aortic course in the literature so far, the RCA courses through the anterior side of the pulmonary artery in the other cases.

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**Figure 1.** RCA originating after the first septal perforating artery in the image taken using anteroposterior projection and cranial angulation.



**Figure 2.** RCA originating from LAD in the coronary computerized tomography angiography image.

Since large vessels cause external compression to the coronary artery, the anomalies in which the RCA originates from the LMCA and courses between the aorta and pulmonary arteries might be considered as one of the reasons for sudden cardiac death at a younger age.<sup>6,7</sup> While our patient had no known risk factors except tobacco use, he had generalized atherosclerosis. Although it has been stated that a single coronary artery anomaly is associated with an increased risk of atherosclerosis in several studies in the literature, such an association could not be demonstrated in others.

## CONCLUSION

While coronary artery anomalies are rare, the anomaly in which the RCA originates from the proximal LAD is even more occasional. When it does, it usually stems from the LAD after the first septal perforating artery (S1) and courses through the anterior side of the pulmonary conus, as in our patient.<sup>7,8</sup>

## ETHICAL DECLARATIONS

### Informed Consent

All patients signed and free and informed consent form.

### Referee Evaluation Process

Externally peer-reviewed.

### Conflict of Interest Statement

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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### Author Contributions

All of the authors declare that they have all participated in the design, execution and analysis of the paper and that they have approved the final version.

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