

## A Rare Case of an Anomalous Origin of the Right Coronary Artery: A Case Report

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### Abstract

The anomalous origin and pathway of the right coronary artery (RCA) is a very rare congenital anomaly of the coronary arteries, in which may be dangerous, and even fatal if it is not discovered. In our case, the patient was presented as an acute MI, and according to the coronary angiography results, he has an anomalous origin of the RCA that arise from the left sinus, furthermore, there was several stenotic lesions and calcifications in the RCA and other coronary arteries. The possible explanation of the mechanism of its occurrence is the mechanical compression of the RCA by the aorta and the pulmonary artery. We provided the results of the coronary angiography, which addressing the anomalous origin, and the other lesions.

**Keywords:** Coronary Artery Anomaly; Congenital Heart Disease; RCA; Anomalous Origin of RCA; Coronary Angiography.

### Background

Coronary artery anomalies are uncommon, in one study, the incidence was reported to be as low as 0.002% [1]. Specifically, the incidence of the anomalous origin of RCA from the left sinus is approximately about 0.1% of the all coronary angiography results [2], and the anomalous pathway of RCA found in about 99% of the patients with anomalous RCA origin [3]. The Clinical presentation depends mainly on the present anomaly. Although most coronary artery anomalies are benign and clinically insignificant, some of them can be dangerous and require urgent intervention [4].

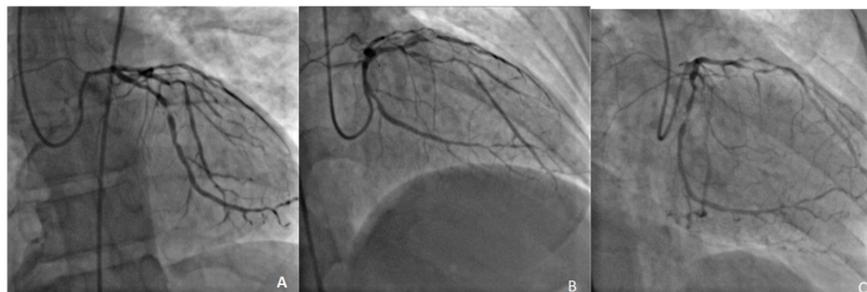
### Case Report

A 54 years old male, with no relevant medical history, no diabetes or hypertension, presented to emergency department of Shifa Medical Complex, Gaza, Palestine, with pressure-like chest pain, then after excluding non-cardiac causes, and depending on ECG results, he was admitted to cardiology department for acute MI.

Coronary angiography was arranged for this patient. Under fluoroscopy, Right Coronary Artery (RCA) was not found in its usual site, but it was found to have a common origin with Left Main Artery from the left coronary sinus.

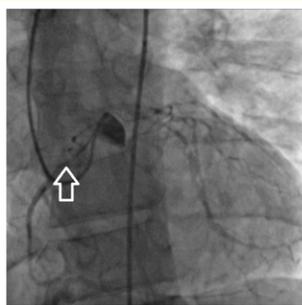
The patient had many stenotic lesions; ostial mild lesion in Left Main Artery, mid-long lesion proximal severe stenosis in Left Anterior Descending Artery (LAD), distal severe stenosis in Left Circumflex Artery (LCX), and proximal and distal severe stenosis in the origin of RCA from left sinus.

Percutaneous Coronary Intervention (PCI) to LAD, LCX, and RCA was arranged for the patient based on angiography images. Images in figure 1 and figure 2 demonstrate the results of angiography done to the patient.



**Figure 1:** Coronary angiography showing the stenotic lesions.

*A: severe calcification in the LCX artery. B: severe diffuse mid LAD lesion. C: diffuse calcifications in mid LAD and LCX artery.*



**Figure 2:** Coronary angiography that demonstrates the anomalous origin of the RCA which arises from the left coronary sinus.

### Intervention

1. A 0.014 inch MS coronary wire has crossed the lesion in LCX to be placed in distal part with free movement. Direct stenting to distal LCX using 2.5\*30 mm resolute onyx stent that deployed at 10 mm in LCX.
2. A 0.014 inch MS coronary wire has crossed the lesion in the diagonal to be placed in the distal part with free movement. Pre dilatation using a 1.5\*20 mm balloon then using a 2.25\*18 mm xience expedition stent was deployed at 18 mm in the proximal diagonal branch.

### Discussion

The congenital anomalies of the origin of the right coronary artery are rare, as well as their incidence around 0.46% and 1.6% of the overall results of the coronary angiography.

The consequences of the anomalous origin of RCA include myocardial infarction, angina pectoris, or even sudden death, in the absence of atherosclerosis.

The definite pathophysiological mechanism that will lead to anomalous origin of RCA is not clearly known, but the nearest explanation of this is the mechanical compression of RCA by the great vessels, the aorta, and the pulmonary artery.

Interestingly, the treatment modalities of the RCA origin anomaly is somehow controversial, some experts recommend the revascularization in all cases, through many interventional options, including the translocation of the RCA to the aorta (excision of the wall between the aorta and the RCA), and grafting bypass of the RCA. But on the other hand, the long-term improvements and benefits of those therapeutic modalities still not addressed.

In our case, it was recommended for this patient to treat the CAD without changing the anatomy of his RCA.

### Conclusion

The rare occurrence of the coronary artery anomalies are known in patients with and without coronary artery obstruction. Awareness of these rare anomalies, their possible locations and distinct mechanisms will help cardiologists in making correct diagnosis and thus, needs to be reported to determine its true prevalence.

### Funding

None.

### Conflict Of Interest

No conflicts to declare.

### Consent

Informed consent was obtained from the patient for publication of this case report and accompanying images.

### Ethical Approval

An official approval was obtained from the Medical Research Department, Ministry of Health, Palestine.

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