

# An unusual congenital coronary anomaly: A circumflex coronary artery arising in “shotgun” with the right coronary artery in anterior ST – elevation myocardial infarction

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## Abstract

**Objective:** Coronary anomalies do not generate symptoms, it is incidental findings when performing a coronary angiography in a patient with ischemic heart disease or valvular heart disease. The anomalous origin of the circumflex (LCX) of the right coronary artery (RCA) is one of the common anomalies. We describe a case of CX orifice arising from right coronary sinus in a “shotgun” manner with orifice of RCA and successful percutaneous coronary intervention (PCI) of left anterior descending artery (LAD).

**Case Report:** In this case, the anomalous incidental finding was the arising of the CX artery in “shotgun” shape with the RCA (separate ostium) in a clinic scenario of anterior ST-segment elevation myocardial infarction wherein the patient received fibrinolytic therapy with alteplase, presenting reperfusion criteria (>50% ST-segment resolution at 60 minutes and relief angina) and then underwent to successful PCI.

**Conclusion:** The ectopic origin of the CX is a well-recognized variant, which is considered the most common coronary anomaly. Although this anomaly is classified as benign and asymptomatic, a few cases of sudden death, myocardial infarction, and angina pectoris in the absence of atherosclerotic lesion have been reported. We described coronary anomaly without atherosclerotic lesion identified in a patient with ST elevation anterior myocardial infarction who underwent successful PCI of culprit LAD. Such coronary anomalies should be considered as well in patients with STEMI undergoing PCI.

**Key words:** congenital coronary anomaly, circumflex coronary artery, orifice, right sinus of Valsalva

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## Introduction

It has been observed that 0.3% to 5.6% of the general population have some type of coronary anomaly (1). Coronary anomalies are incidental findings when coronary angiography is performed in patients with valvular disease or ischemic heart disease (2). The anomalous origin of the circumflex coronary artery (CX) from right coronary artery (RCA) has a frequency of 0.32% to 0.67% (1). CX and RCA can arise from a common ostium or from separate ostia. In the absence of coronary atherosclerosis, the anomaly may be considered benign (1).

We describe a case of CX orifice arising from right coronary sinus in a “shotgun” manner with orifice of RCA in a patient with anterior ST-elevation myocardial infarction (STEMI) undergoing percutaneous coronary intervention (PCI).

## Case report

A 78-year-old female, with cardiovascular risk factors as hypertension and being postmenopausal and without previous cardiovascular history experienced an oppressive chest pain with irradiation to the left arm lasting more than 20 minutes and diaphoresis. The patient arrived at a medical center where an electrocardiogram was taken and an anterior STEMI was revealed (Fig. 1). The informed consent of the patient was obtained before all procedures.

Due to our PCI center was more than 120 minutes away, it was decided to proceed with thrombolysis using alteplase and indirect criteria of reperfusion (>50% ST-segment resolution at 60 minutes and relief angina) were documented. Then the patient was sent to the interventional cardiology department of our hospital for early pharmacoinvasive therapy.

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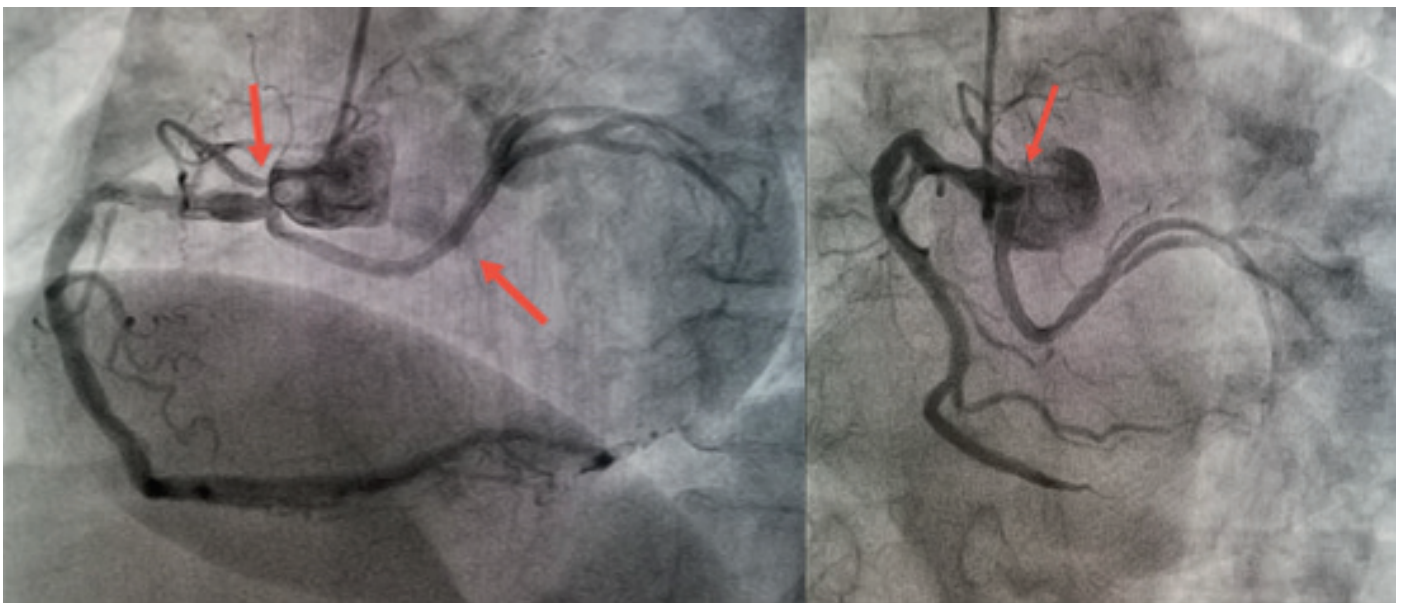
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The coronary angiography showed normal dominant RCA and an anomalous origin of the CX, arising from the right sinus of Valsalva in a “shotgun” shape with separate of the RCA ostium, both without angiographic lesions (Fig. 2). In the left system,

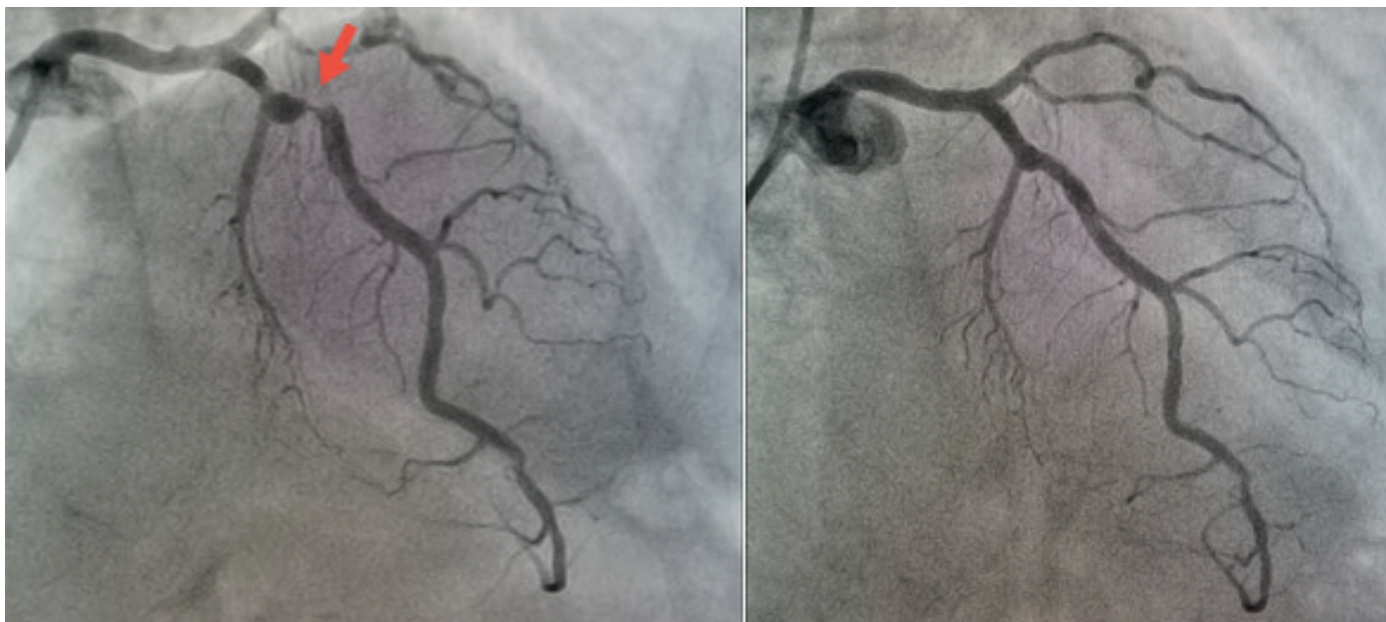
the LAD emerged as the only vessel with 90% lesion in the proximal segment (Fig. 3). Percutaneous coronary intervention was performed with deployment of a drug-eluting stent with a successful result (Fig. 3).



**Figure 1. Electrocardiogram showing ST segment elevation from V1 to V6**



**Figure 2. Coronary angiography LAO and RAO projection. Anomalous origin of the CX in the right sinus of Valsalva in shotgun shape with the RCA (separate ostium). CX- circumflex artery, LAO – left anterior oblique view, RAO – right anterior oblique view. RCA- right coronary artery**



**Figure 3. Coronary angiography 10-40° projection. Left anterior descending coronary artery as the only vessel of the left system with significant lesion in the proximal segment. The second image shows TIMI3, TMP3 flow after PCI with deployment of a drug-eluting stent.**

**PCI – percutaneous coronary intervention**

### Discussion

During the third week of fetal development, changes can occur resulting in development of coronary artery anomalies (3). Coronary anomalies are incidental findings by coronary angiography study, however sudden cardiac death can occur in patients with coronary artery anomalies and may result from contortion of the vessel's slit-like, tangential origin that during exercise leads to ischemia and resultant arrhythmia (4). The atherosclerotic and valvular heart diseases lead to the need of coronary angiography and heart catheterization, which can find out the presence of coronary artery anomalies. The ectopic origin of the CX is a well-recognized variant, which is considered the most common coronary anomaly. Although this anomaly is classified as benign and asymptomatic, a few cases of sudden death, myocardial infarction, and angina pectoris in the absence of atherosclerotic lesion have been reported.

In this case, the anomalous incidental finding was the arising of the CX artery in "shotgun" shape with the RCA (separate ostium) in a clinical scenario of anterior STEMI wherein the patient received fibrinolytic therapy with alteplase, achieved reperfusion criteria (>50% ST-segment resolution at 60 minutes and relief angina) and then underwent successful PCI of culprit vessel – LAD and stent deployment. Interestingly that both CX and RCA showed no atherosclerotic lesions.

Our case shows that rare coronary anomalies can be detected in non-culprit vessels during PCI for STEMI. Interventional cardiologists should be aware of such incidental findings.

The limitation of our case report is that we could not provide the troponin values and echocardiography images as patient was transferred to our clinic for PCI from another clinic where she underwent diagnostic workup and treatment for STEMI. However, the diagnosis of STEMI was based on clinical presentation of chest pain, ECG with ST-elevation in anterior leads, increased troponin values and wall motion abnormalities on echocardiography consistent with anterior STEMI.

### Conclusion

Our case demonstrated that anomalous origin of CX from right coronary sinus of Valsalva in "shotgun" manner with separate orifice from RCA (both CX and RCA without any lesions) can be detected in a patient with acute anterior STEMI undergoing coronary angiography and PCI with stenting for culprit LAD stenosis. Interventional cardiologists should be aware of such rare findings.

**Ethics:** Informed consent was obtained from patient before all procedures

**Peer-review:** External

**Conflict of interest:** None to declare

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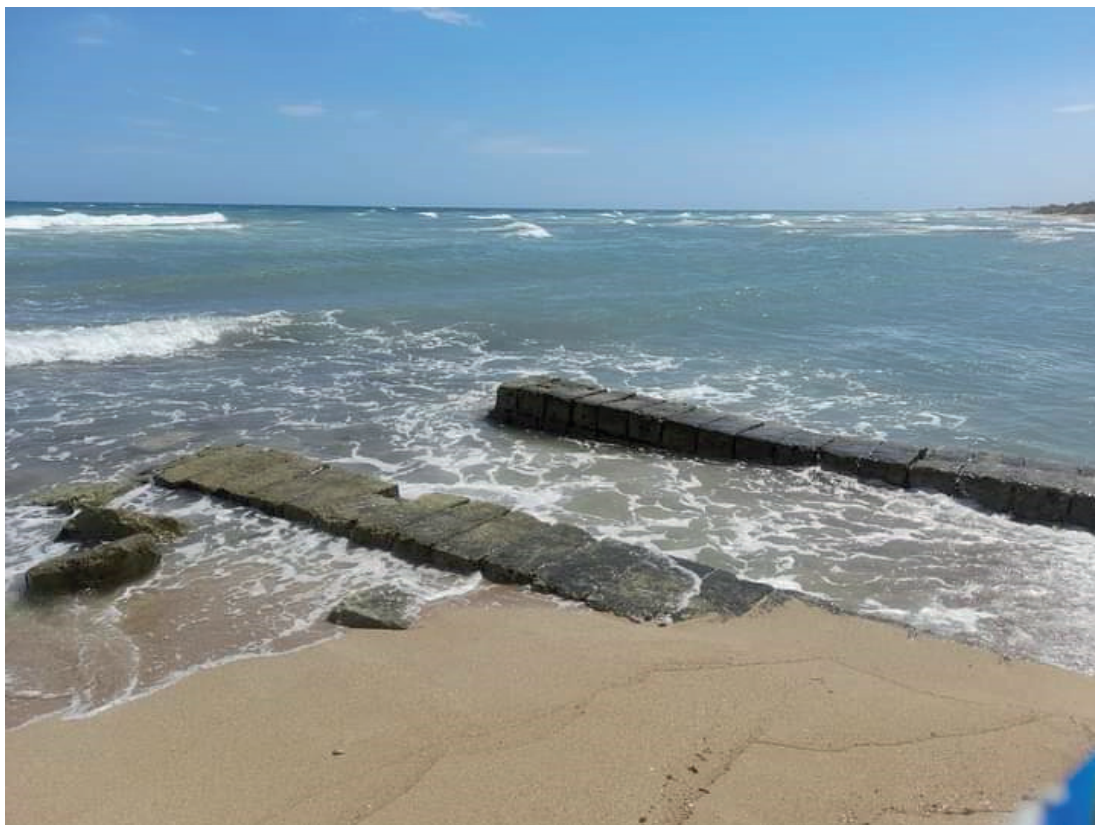
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