

# CARDIOVASCULAR IMAGES

A joint publication of the Department of Radiology and Heart Center

## 54 Year-Old Man with an Abnormal Nuclear Stress Test

Erick Avelar, MD, Roberto Cubeddu, MD, Rodrigo Pale, MD, Hiram Bezerra, MD, Ronen Durst, MD, and Wilfred Mamuya, MD, PhD

### Clinical History

A 54 year-old asymptomatic man with a past medical history of hypertension, hypercholesterolemia, and peripheral vascular disease in the right arm secondary to a vascular injury had an exercise sestamibi stress test as part of his regular "check up". He exercised for 10 minutes according to the standard Bruce protocol, stopping due to fatigue. He reached 87% of his maximum predicted heart rate. The myocardial perfusion images demonstrated a clear-cut "diaphragmatic" attenuation artifact, but in addition, there was moderate inferior and inferobasal reversible ischemia at stress, which normalized at rest.

Cardiac catheterization demonstrated an anomalous origin of the right coronary artery (RCA) from the left coronary cusp (LCC) with a possible eccentric 90% stenosis in the ostium and proximal third. Despite multiple views, it was difficult to determine whether the narrowing was due to a true lesion or was secondary to a streaming artifact. The lesion was not completely eradicated by intra-coronary nitroglycerin (Figure 1). The patient was referred for computerized tomographic angiography (CTA) of the coronary arteries for better delineation of the RCA lesion. The CTA confirmed the coronary anomaly seen on the coronary angiogram and, more importantly, defined the potential malignant inter-arterial course of the RCA between the main pulmonary artery and the ascending aorta (Figures 2-3).

### Discussion

Right coronary anomaly is a rare condition with an incidence of 0.26%. It can be a benign or potentially serious condition. Prior case reports demonstrate that the malignant type anomalous right coronary artery may even culminate in cardiac arrest or sudden death, the exact mechanism of which is not completely understood.

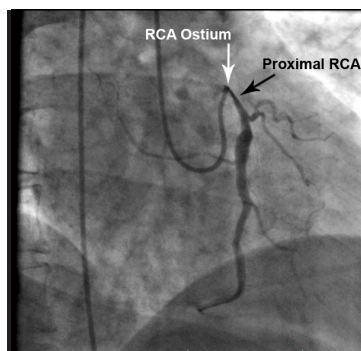


Figure 1

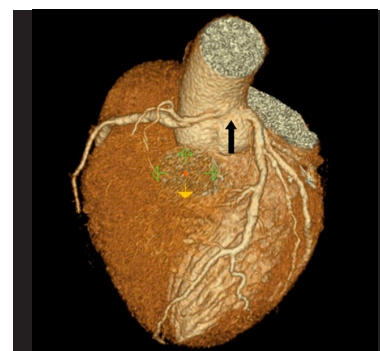


Figure 2

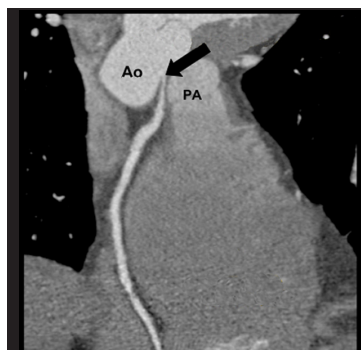


Figure 3

**Figure 1.** Coronary angiogram demonstrating an undefined lesion in the proximal RCA.

**Figure 2.** Volume-rendered cardiac CTA demonstrating the right coronary artery (RCA) originating from the left coronary cusp (LCC). Black arrow shows the LCC.

**Figure 3.** Curved reformat of the RCA demonstrating the inter-arterial course between the aorta (Ao) and the pulmonary artery (PA). The proximal segment is stenotic (black arrow) compared to the distal reference vessel, but no coronary plaque was identified.

However, it is postulated that compression of an inter-arterial coronary artery occurs, leading to myocardial ischemia and consequent ventricular fibrillation arrest. Coronary artery bypass graft surgery (CABG) is the most feasible treatment option.

This case demonstrates the unique ability of the CTA to easily and definitely define the inter-arterial course of the RCA originating from the left coronary cusp.

### REFERENCES

1. Ichikawa, M., Y. Sato, et al. (2007). Multislice computed tomographic findings of the anomalous origins of the right coronary artery: evaluation of possible causes of myocardial ischemia. *Int J Cardiovasc Imaging* 23: 353-60.
2. Lorenz EC, Mookadam F, Mookadam M, Moustafa S, Zehr KJ. (2006) A systematic overview of anomalous coronary anatomy and an examination of the association with sudden cardiac death. *Rev Cardiovasc Med* 7:205-13.
3. Weininger, M., A. Bonz, et al. (2007). Multi-slice cardiac computed tomography reveals anomalous origin of the right coronary artery between the great arteries. *Int J Cardiol* 119: e77-8.

Editors:

Suhny Abbara, MD

MGH Department of Radiology

Wilfred Mamuya, MD, PhD

MGH Department of Cardiology

