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# Anomalous and Diseased Left Main Coronary Artery Arising from the Right Coronary Sinus in an Elderly Lady

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## Abstract

We report a case of 66-year-old female patient who presented with unstable angina and New York Heart Association Class III symptoms. Echocardiogram demonstrated wall motion abnormalities in the anterior and inferior walls. Coronary angiography demonstrated a severely diseased right coronary artery (RCA) and anomalous left main (LM) coronary artery arising from the right coronary sinus and courses posterior to the aorta and runs between the aorta and the main pulmonary artery with severe multiple atherosclerotic disease. Patient underwent successful coronary artery bypass grafting and was dismissed in good general status.

**Keywords:** Anomalous left main, Coronary anomaly, Coronary artery disease, Coronary artery bypass grafting

## 1. Introduction

Coronary artery anomalies are diverse group of rare congenital disorders with wide range of clinical presentations [1]. Most of these anomalies are detected incidentally during diagnostic coronary angiography or at autopsy studies, however they got significant clinical importance since they are considered as the second most common cause for sudden death after exertion in young athletes next to hypertrophic obstructive cardiomyopathy [1].

In this case we present a very rare coronary artery anomaly in an elderly patient who presented with acute coronary syndrome and found to have anomalous LM arising from the right coronary sinus associated with severe atherosclerosis involving both normal and anomalous coronary arteries and who was managed by coronary artery bypass grafting (CABG).

## 2. Case report

A 66-year-old hypertensive female patient was investigated for attacks of unstable angina. Echocardiogram demonstrated regional wall abnormalities in the anterior and the inferior segments. Left heart catheterization demonstrated significant RCA stenosis, with super dominance in distribution pattern (Fig. 1). Left main coronary artery had anomalous origin from the right coronary sinus with significant stenosis and small caliber left anterior descending (LAD) and Circumflex arteries. Coronary Computed Tomography (CT) for better assessment of the anatomy was performed and showed anomalous LM coronary artery arising from the opposite sinus and courses posterior to the aortic root with significant stenosis (Fig. 2A), then branching on the anterior and lateral surfaces of the heart with significant stenosis and small quality LAD and circumflex arteries (Fig. 2B). A heart team decision was made to offer this lady coronary artery

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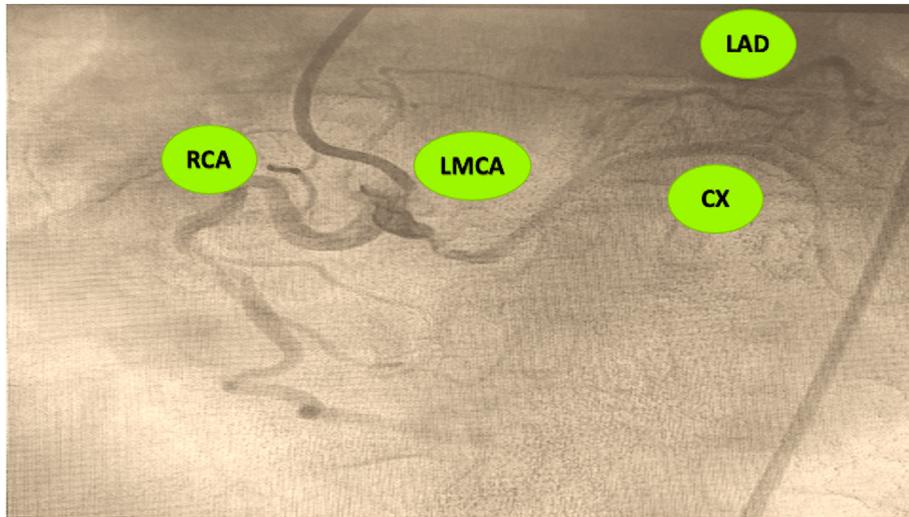


Fig. 1. Coronary artery angiography demonstrating the anomalous LM origin from the right coronary sinus and the severe atherosclerosis involving the coronary arteries. RCA: Right coronary artery, LMCA: Left main coronary artery, LAD: Left anterior descending artery, CX: Circumflex artery.

bypass surgery as a valued option taking in consideration her left main coronary anomaly in addition to the atherosclerotic disease.

Surgery was performed via median sternotomy incision using cardiopulmonary bypass utilizing left internal mammary artery (LIMA) and left great saphenous vein as conduits. Right internal mammary artery was spastic during harvest, so it was excluded from use as a potential graft to the RCA. Vein grafts were used to bypass diseased RCA and circumflex arteries while the LIMA was anastomosed to the LAD. Both LAD and circumflex arteries were small in caliber with multiple stenotic lesions. Intraoperative assessment of the grafts showed excellent flow parameters. Patient did well and had uneventful recovery period.

### 3. Discussion

We present a rare case with anomalous LM coronary artery arising from the right coronary sinus with a superadded severe atherosclerotic disease involving both the normal and anomalous arteries. Based on its course, anomalous LM arising from the right coronary sinus had been classified as follows: A. Passing anterior to the aorta in the right ventricular outflow, B. Inter-arterial course (between the aorta and the pulmonary artery), C. Courses through the crista of the septum, D. Passing posterior to the aortic root [2,3]. Based on this classification, our case had combined anomalous origin of the LM coronary artery and abnormal course type D.

Coronary artery anomalies are very rare congenital cardiac disorders, with variable incidence

reported in literature and wide range of clinical presentation [1]. LM arising from the right coronary sinus or the proximal segment of the right coronary artery is an extremely rare coronary anomaly with a reported incidence of 0.09–0.11% in the general population [4]. Majority of the anomalous origin of the coronary arteries are benign, however clinical presentation may vary according to the left main course, and may presents with sudden death, arrhythmias or myocardial ischemia [3]. Pathophysiology behind this can be explained as follows [5]: The slit like orifice of the anomalous coronary artery may lead to loss of blood flow, possible compression during its course especially in the interarterial course, or it may be vulnerable to the process of atherosclerosis as in our case.

The incidence of atherosclerotic disease involvement in anomalous coronary arteries is controversial and ranging from 1.7% to 72.2% according to previously published reports [1]. This variation in the incidence could be related to the patient characteristics included or the imaging modality utilized for diagnosis [1]. Certain reports demonstrated that anomalous coronary arteries are comparable to normal coronaries in the potential for developing atherosclerosis [6]. Few studies have reported that anomalous left coronary arteries arising from the right coronary sinus as in our case are more vulnerable to develop atherosclerosis [7]. A superadded significant atherosclerotic disease in the anomalous coronary arteries poses a high therapeutic challenge due to the difficulties in utilizing percutaneous coronary interventions taking in consideration the complex anatomical findings and the increased fluoroscopic times.

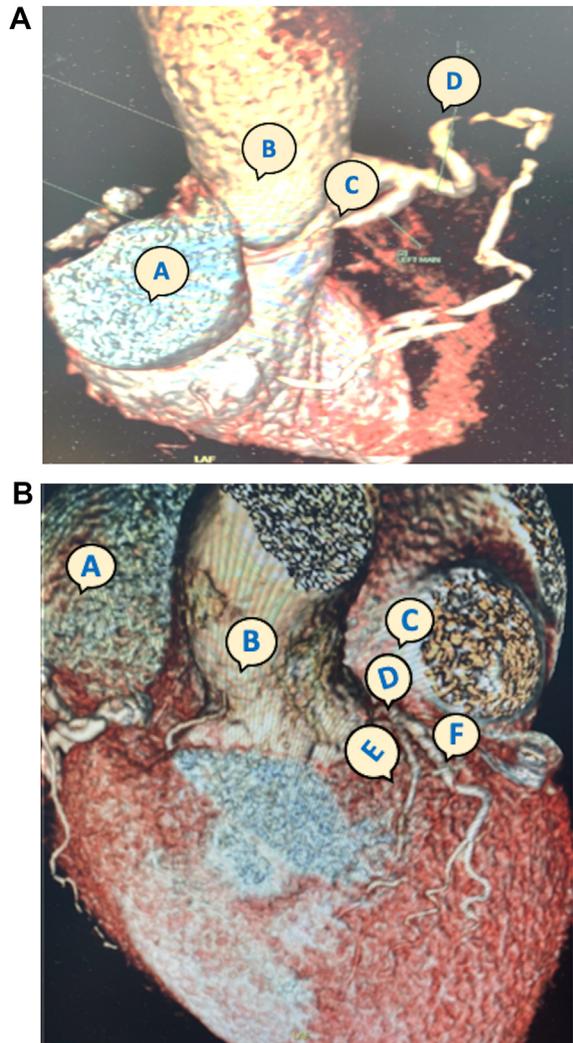


Fig. 2. A: Coronary Computed Tomography (Posterior View): This figure illustrates the anomalous origin of the left main coronary artery from the opposite sinus and the retroaortic course as well as the severe atherosclerotic disease involving the left main and right coronary arteries. A: Pulmonary Artery, B: Aortic Root, C: Left Main Coronary Artery, D: Right Coronary Artery. Fig. 2B: Coronary Computed Tomography (Anterior View) demonstrating the termination of the left Main Coronary Artery with small terminal branches. A: Right Atrium, B: Aortic Root, C: Pulmonary artery, D: Left Main Coronary Artery, E: Left Anterior.

Surgical intervention is recommended once diagnosis is established especially for those patients with the interarterial course [2]. Modalities of surgical intervention included: Unroofing of the proximal left main intramural course, Ostial re-implantation, Coronary artery bypass grafting and pulmonary artery translocation [2]. The complex anomalous anatomy with superadded atherosclerotic severe atherosclerotic disease involving the normal and anomalous coronary arteries in our case scenario

made us reach an agreement to choose coronary artery bypass grafting as a valid choice.

To conclude, despite the fact that anomalous origin of the left main coronary artery is a rare congenital anomaly, it should be kept in mind as a possible diagnosis. Coronary computed tomography is an excellent diagnostic modality to clarify its course.

### Author's contribution

Conception and design of Study: Salah E. Altarabsheh, Salil V. Deo. Literature review: Salah E. Altarabsheh, Salil V. Deo, Abeer M. Rababa'h. Acquisition of data: Fadi H. Alhusban, Rami A. Alsharbini. Analysis and interpretation of data: Abeer M. Rababa'h, Fadi H. Alhusban. Research investigation and analysis: Salah E. Altarabsheh, Salil V. Deo, Rami A. Alsharbini. Data collection: Salah E. Altarabsheh, Salil V. Deo, Abeer M. Rababa'h, Fadi H. Alhusban. Drafting of manuscript: Salil V. Deo, Abeer M. Rababa'h, Rami A. Alsharbini. Revising and editing the manuscript critically for important intellectual contents: Salah E. Altarabsheh, Fadi H. Alhusban. Data preparation and presentation: Salil V. Deo, Abeer M. Rababa'h, Rami A. Alsharbini. Supervision of the research: Salah E. Altarabsheh, Salil V. Deo. Research coordination and management: Abeer M. Rababa'h, Fadi H. Alhusban, Rami A. Alsharbini. Funding for the research: Salah E. Altarabsheh, Salil V. Deo.

### Informed consent

Patient was consented for publishing his case.

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None.

### Conflicts of interest

None.

### Acknowledgment

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