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Absence of the Left Main Artery with Separate Ostia of the Left Anterior Descending Artery and Circumflex from the Left Sinus Valsalva: A Case Report

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Abstract Coronary artery anomalies are diagnosed in approximately 1% of patients who undergo coronary angiography (CAG). Several anomalies are life threatening but are generally asymptomatic and clinically insignificant. Nonetheless, proper recognition and adequate visualization is necessary for proper medical management, especially in patients undergoing percutaneous coronary intervention or cardiac surgery. In this report, a 73-year-old female was admitted for NSTEMI. Coronary angiography revealed a stenotic right coronary artery and separate ostium of the left circumflex artery and left anterior descending artery from the left Valsalva sinus. The patient was treated with percutaneous coronary intervention of the RCA lesion.

Keywords: *dual ostium, absence of left main artery, angina, accelerated atherosclerosis, coronary angiography*

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1. Introduction

Coronary artery anomalies are rare in the general population, with a prevalence rate of approximately 1%, although most are found incidentally during coronary angiography [1].

Most anomalies are benign, such as anomalies of origin, but several serious anomalies may lead to cardiac arrhythmia, myocardial infarction, and sudden death [1]. Nonetheless, it is critical to recognize and adequately visualize clinically insignificant anomalies for appropriate patient management, especially in patients being evaluated for percutaneous coronary intervention and cardiac surgery [2].

We describe a case of a patient with non-ST segment elevation myocardial infarction (NSTEMI) in which coronary angiogram revealed severe occlusion in the right coronary artery and anomalous separate origin of the left anterior descending artery (LAD) and left circumflex (LCX) arising from the left coronary aortic sinus.

2. Case Presentation

A 73 year-old-female with a history of hypertension, diabetes, hyperlipidemia, heart failure preserved ejection fraction (ejection fraction: 55%), coronary artery disease (CAD) status post two drug eluting stents was sent to the hospital by her podiatrist for shortness of breath and low oxygen saturation of 80% associated worsening dyspnea on exertion. On arrival to the emergency department she was afebrile, heart rate was 74 beats/minute, blood pressure was 144/75 mm Hg, respiratory rate was 34 breaths per minute and oxygen saturation was 87% on room air. Physical exam was pertinent for bilateral basilar crackles and bilateral lower extremity edema +2. Computed tomography angiography revealed interstitial pulmonary edema with bronchial wall thickening, more prominent at the lung bases. Patient's vitals and symptoms improved with 2 liters of oxygen on nasal cannula and 60mg of intravenous Furosemide. Initial troponin was elevated (0.62 ng/mL) whereas complete blood count and comprehensive metabolic panel were unremarkable. Electrocardiogram showed new right bundle branch block (see Figure 1). She was subsequently loaded with aspirin, clopidogrel and full dose enoxaparin. The following day, the patient underwent coronary angiography through the right femoral artery access. The coronary angiography showed two separate ostia for the left anterior descending artery (LAD) and left circumflex (LCX) from the left coronary sinus. There was a 99% occlusion in the proximal right coronary artery (RCA) and 80% occlusion in the mid RCA. She was treated with two drug eluting stents placed in the proximal and mid RCA (see Figure 2). Patient was later discharged in a stable medical condition with aspirin and Plavix.

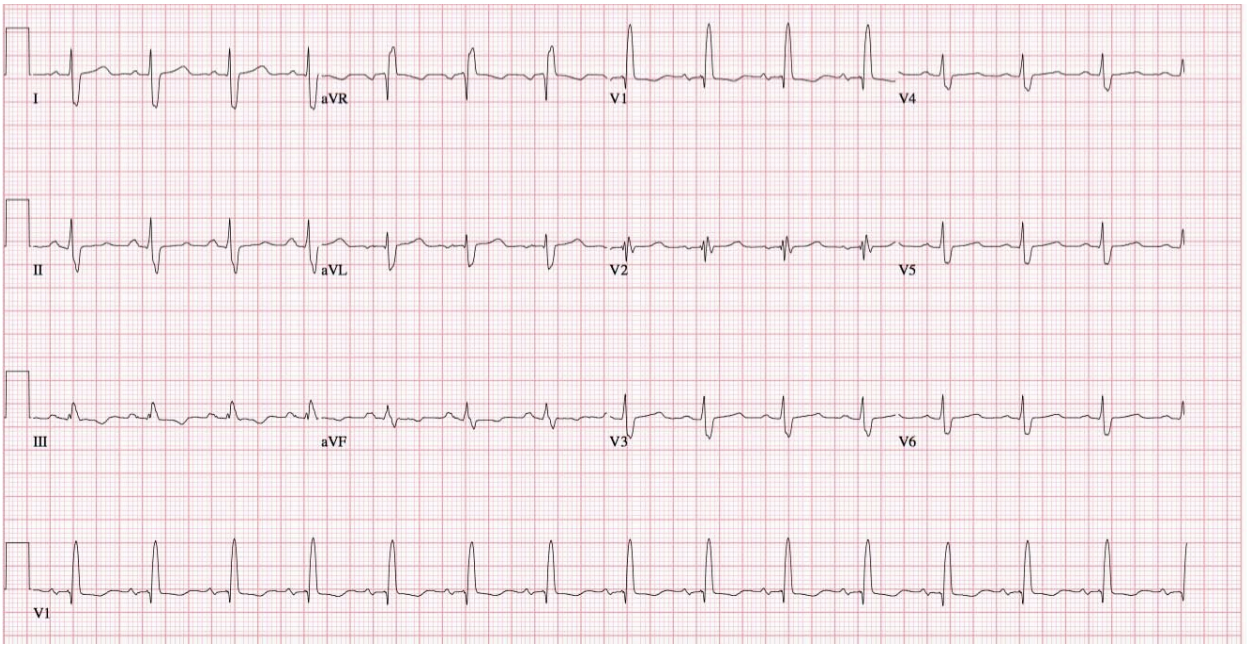

Figure 1.

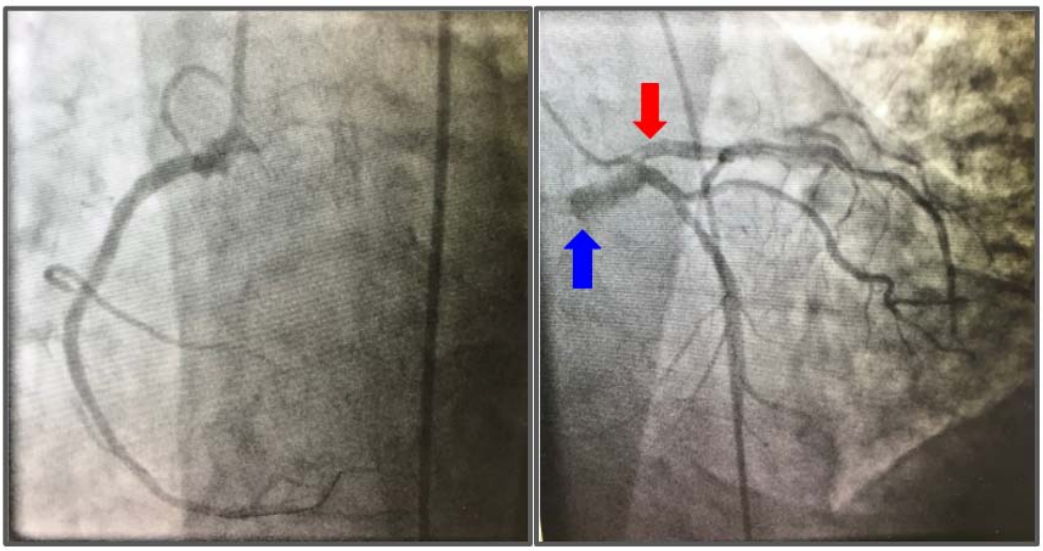

Figure 2.

3. Discussion

The prevalence of congenital coronary artery anomalies is approximately 1.3% based on a large study of patients undergoing coronary angiography from 1960 to 1988. A study comprising 126,595 patients who underwent coronary angiography, identified a total of 1,686 individuals (1.3%) with coronary anomalies and 81% of these involved anomalies of origin and distribution [1]. A rare anomaly of origin is the absence of the left main trunk and the LAD and the LCX arising from two separate adjacent ostia from the left sinus Valsalva. This anomaly is more likely to be associated with aortic valve disease and dominance of the left coronary artery [2]. Separate ostia of the LAD and LCX was seen in 0.41% of the cases [1]. Another author found this anomaly in 2 (0.2%) of 1000 consecutive necropsies, while another study encountered separate ostium for LAD and LCX in 1.6% of 2089 necropsied patients [4].

Table 1. Published case reports on dual ostium of LAD and LCx from left sinus Valsalva

First author, Year of publication Reference Number	Age	Sex	Symptoms	Diagnosis	TTE/TEE	CT	Coronary angiogram	Management
Man Yong Hong, 2013 [12]	59	M	Chest pain	STEMI	-	Yes	Yes	Stent in proximal LAD
Ilia, 1998 [13]	47	M	Chest pain	STEMI	-	-	Yes	Stent in proximal LAD
Thomas, 2005 [14]	62	M	Chest pain	Unstable angina	-	-	Yes	-

STEMI: ST segment elevation myocardial infarction.

Most coronary anomalies are benign; however, several serious anomalies may result in angina pectoris, syncope, cardiac arrythmias, myocardial infarction and sudden death. These clinical manifestations may be caused by compression of anomalous artery by a dilated aortic root, slit-like ostia, or unusual angling due to the retro-aortic course of an artery [5,6]. Anomalous arteries are also more likely to develop earlier and more aggressive atherosclerosis leading to myocardial infarction and sudden death [7]. Serious anomalous coronaries include but are not limited to ectopic coronary origin from the pulmonary artery, ectopic coronary origin from the opposite aortic sinus, and single coronary artery [1,5]. However, anomalies of origin are usually benign and asymptomatic for most patients. Nevertheless, it is critical to recognize rare but clinically insignificant anomalies as failure to angiographically identify anomalous coronaries can result in misdiagnosis, such as erroneously confusing a non-visualized artery as being totally occluded at its origin, prolonged procedures and serious complications, especially in patients who undergo coronary angioplasty or coronary surgery [8].

Different imaging modalities can be used to identify coronary anomalies. Coronary angiogram is the traditional method to diagnose coronary abnormalities at the origin utilizing non-selective injection of contrast material into the Valsalva sinuses although, in some cases this approach may be ineffective [9]. Coronary CT angiography is now considered the ideal imaging tool for the diagnosis and delineation of anomalous coronaries [10,11].

We were able to identify the LAD and LCX with separate origins arising from the left coronary sinus in the coronary angiogram. Our review of the current literature indicates that such anomaly is relatively rare (Table 1). Our patient was found to have a 99% occlusion and 80% occlusion in the proximal and mid RCA respectively requiring the placement of two coronary stents however, the anomalous coronaries were free of coronary disease.

Acknowledgements

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