PAKISTAN JOURNAL OF Cardiovascular Intervention

OPEN ACCESS

CASE REPORT

Anomalous Coronary Artery Presenting with S-T Elevation Myocardial Infarction: A Case Report

Mukesh Kumar[1], Rizwan Qurban Ali Khawaja[1], Fawad Farooq[1], Abdul Hakeem[1] & Atif Sher Muhammad[2]

[1]National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan.
[2]Karachi Institute of Heart Diseases, Karachi, Pakistan.

Citation:
Kumar M, Khawaja QRA, Farooq F, Hakeem A, Muhammad AS Anomalous Coronary Artery Presenting with S-T Elevation Myocardial Infarction: A Case Report. PJCVI. 2022; 2(1): 40-44.

Corresponding Author Email:
mukesh_nicvd@yahoo.com

DOI: 10.58889/PJCVI.2.40.44

Funding:
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflicts of Interests:
The authors have declared that no competing interests exist.

Received 02/04/2022
Accepted 15/05/2022
First Published 01/06/2022

Abstract

Background: Coronary artery anomalies are very rare congenital conditions. Rarely occurring but potentially fatal abnormalities of the coronary vasculature, abnormalities of the coronary arteries can cause significant cardiac events such as myocardial ischemia (S-T Segment elevation MI) and cardiac arrest.

Case Presentation: We are presenting a case of a 60 years old hypertensive female patient who presented with ST-segment elevation in all precordial leads.

Management & Results: On angiography, a giant right coronary artery was seen, and no Left coronary artery origin was not appreciated. Hence, Multidimensional CT angiography was done that showed dilated and ectatic left main coronary artery circulation originating from the pulmonary artery just above the pulmonary valve. The patient was declared a high-risk surgical candidate, was advised medical therapy, including beta blockers, dual antiplatelet, and antihyperlipidemic medications, and was advised to restrict physical activity.

Conclusion: The rare presentation of an aberrant coronary artery is myocardial infarction with ST-segment elevation, and it might be difficult for doctors and cardiologists to determine the true reason without intervention. To optimize the care of these patients, traditional CAA and MDCT must be integrated with the clinical presentation of the patients.

Keywords

Coronary Artery Anomaly, Giant Right Coronary Artery, Multidimensional CT Angiography, Pulmonary Artery, S-T Segment.

Introduction

Anomalies of Coronary Arteries are rarely seen but are reported to be one of the life-threatening abnormalities of coronary vasculature, which can lead to serious cardiac events, including myocardial ischemia (S-T Segment elevation MI) and cardiac arrest[1]. These anomalies are still considered debatable and continuously changing in terms of their definition, morphogenesis, clinical presentation, diagnostic workup, and management plans[2]. Edward and White RCA first described it as an anomalous and rare congenital abnormality in 1948[3].

Incidence of Coronary anomalies is reported in autopsy studies as 0.17% and in Angiographic series as 1.3%[4]. A study at Cleveland Clinical foundation done from 1960-1988 found 1686 patients with CAA, i.e., an incidence of 1.3%[5]. At the same time, the presentation of Coronary anomalies with ST-Segment Elevation is very rare[6]. Data suggest that if occlusion is found, it will be difficult to cannulate coronary arteries because of anomalous structure[7].

Here we are presenting a case report of a female who was 60 years of age, who was initially diagnosed with anterior wall myocardial infarction (STEMI) and found to have a giant Right coronary artery and anomalous origin of the left anterior descending artery.

Case Presentation

A female patient of 60 years of age, on treatment for hypertension for the past 15 years, resident of the remote village of Sindh Pakistan, presented to the cardiac emergency mobile unit (in interior Sindh) with Typical chest pain which was sudden in onset, lasted for 45min, pressure over the chest, diffuse in character radiating to left arm and neck with Canadian Cardiovascular Society Grade III (CCS). ECG showed sinus rhythm with S-T Segment Elevation patient was given ACS (acute coronary Syndrome) protocol. It was referred to the National Institute of Cardiovascular Disease (NICVD), Karachi, for Further Management.

Management & Results

The patient was received in Emergency after 36 hours of chest pain, late for reperfusion, Killip class I, TIMI of 3/7, chest pain was CCS grade II. The patient was Vitally Stable; ECG showed S-T Segment Elevations in V1-V3 and reciprocal S-T Depressions in limb leads.

On Examination old woman of average height, thin build, well oriented with time, place, and person was sitting comfortably on the bed. Her general physical examination was unremarkable. Neurological, respiratory, and abdominal examinations were unremarkable. A cardiovascular examination, Inspection: Chest was symmetric, with no heaves, no scars or thrill, and symmetrical chest movements with respiration. Palpation: apex beat was palpable with the maximal impulse at the 5th intercostal space, 1cm away from the midclavicular line. Auscultation: S1 and S2 were audible in all four areas with regular rate and rhythm, no splitting of heart sound heard, and no murmur on maneuvers. No S3 and S4 or frictional rub.

Echocardiography was done, which showed an Ejection Fraction of 45%, normal LV with Atypical septal motion with systolic dysfunction TAPSE 21. The patient was taken to the cath lab for angiography, which showed Anomalous Coronary Circulation where Right Coronary Artery (RCA) was arising from Right coronary cups Figure1 and Left Coronary artery was not appreciated; there was no other finding. Spontaneous Resolution of symptoms and S-T Segment resolution were seen during the procedure; hence Coronary intervention was not required, and normal TIMI flow was seen in the coronary circulation. The patient was kept under observation until they became pain-free and stable with medical therapy with Clopidogrel, Bisoprolol, Ramipril, Aspirin & Rosuvastatin.

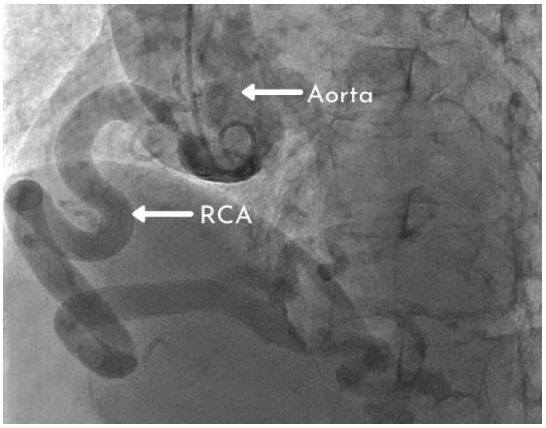

Figure 1: Coronary angiography showing Giant Right coronary artery

Multi-Directional CT Angiography (MDCT) showed Superdominant Giant RCA. The left main short dilated ectatic (10mm) anomalous artery originates from a pulmonary artery just above the pulmonary valve (figure 2) with no atherosclerotic plaque noted. The patient was discharged after 3 days of MDCT and advised to follow up after one month.

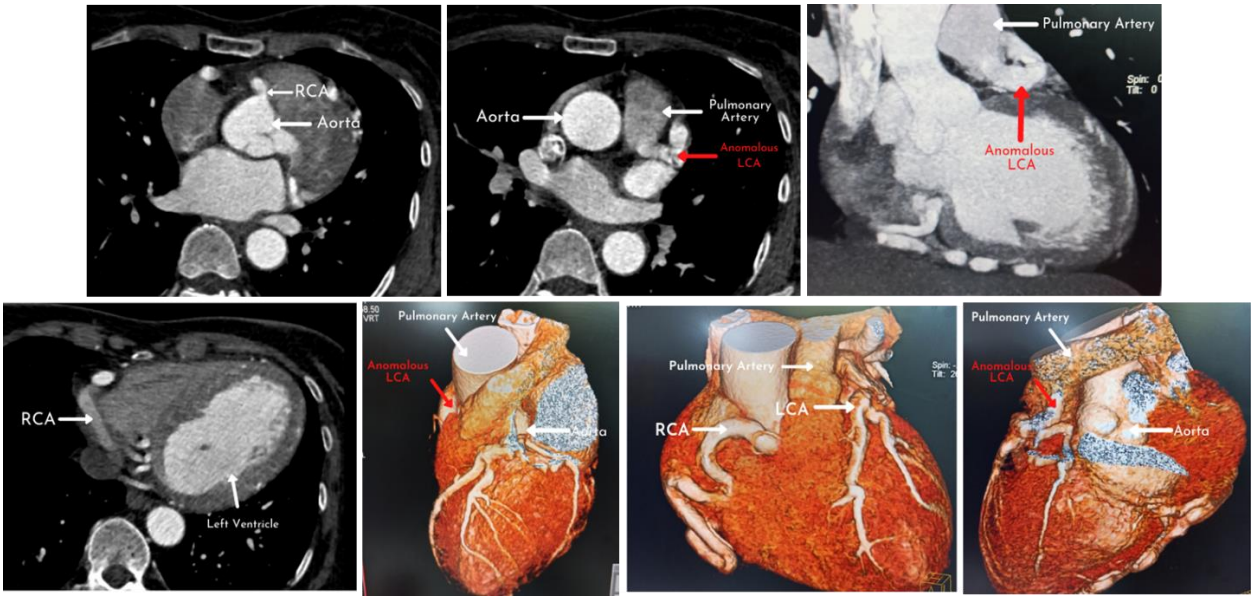

Figure 2: Multi-Directional Coronary angiography showing anomalous origin of Left coronary artery. RED MARK: shows anomalous origin from the pulmonary artery.

Discussion

Incidence of Coronary anomalies is reported at 0.17% in studies done on autopsies and 1.3% in a series of angiographic studies[4] All of which anomalies of the coronary artery are classified into anomalies: a) of origin of the artery and its course, b) of Anatomy of coronary artery c) of ending of arteries d) Anastomotic vessels. Anomalies of origin can include i) abnormal coronary ostium (low or high take off), ii) Coronary ostium originating out of the normal coronary aortic sinuses, iii) Absent Left main trunk, iv) coronary ostium arising from inaccurate sinus[8]. On the other hand incidence of the left sinus giving rise to a right coronary artery is 0.92%, and the right sinus giving rise to the left coronary artery is around 0.15%[9].

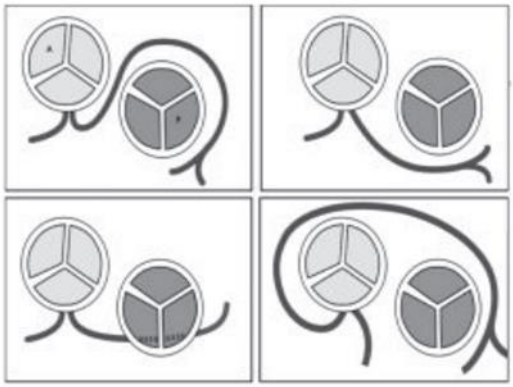

Figure 3: Top left: LMCA is traveling between the pulmonary trunk and aorta. Top right: LMCA is traveling anteriorly over the right outflow of the ventricle. Bottom left: lMCA passing subendocardial and intramyocardially through the course. Bottom right: LMCA arises from the right side of the right coronary artery and passes posterior to the aortic root. Right sinus of Valsalva giving origin to left main coronary artery (lMCA).

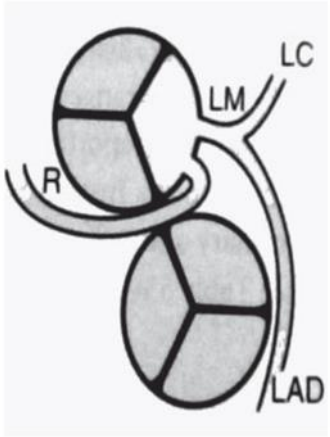

Figure 4: left sinus of aorta giving common origin to the right and left coronary arteries.

There is usually no symptom present in the patient when coronary arteries originate from the opposite coronary sinus. Symptoms sometimes occur in the 2nd and 4th decade of life patients can present with variable symptoms, including Shortness of breath, dizziness, VF, Pain in the chest, syncope hypertension, and unexpected death. Immediate death is reported in young adults during extreme exercise[8].

Workup and diagnosis of coronary artery anomalies require investigation, including Holter monitoring to observe arrhythmias. Echocardiography can only help to identify proximal courses[10]. CT Angiography confirms the diagnosis, and it identifies the course of vessels, kinking, or angulation of vessel pathways. The stress test is also important to evaluate ischemia under stress. Coronary angiography to exclude additional atherosclerosis in coronary arteries and to check ectopic vessels. Interventional management requires intravascular ultrasonography[8].

Symptomatic patients require treatment which includes coronary intervention with stenting, medical treatment, or observation and repair through surgery. Effective medical treatment

includes Beta-Blockers and avoiding strenuous activities. Patients usually become asymptomatic with medical management[10].

Angiography with stenting is done in the case of obstructed intramural segments with right coronary artery anomaly. Indication for angioplasty includes i) Stenosis of more than 50% of the lumen, ii) severe symptoms and high risk of death, iii) ischemia of more than ⅓ of the myocardium, iv)Stress test showing reversible ischemia. In comparison, drug-containing stents are advised to avoid restenosis. Surgery is indicated in the presence of left Coronary artery anomaly irrespective of symptoms.

Right Coronary artery anomaly is six times more common and has a better prognosis than left coronary artery stenosis. Sudden cardiac death is more commonly seen in a patient with left coronary artery anomaly, while it is extremely low in the case of asymptomatic right coronary artery anomaly[11].

Conclusion

It is concluded that Myocardial infarction with ST-segment elevation is the infrequent presentation of an anomalous coronary artery and can become challenging for physicians and cardiologists to find an actual cause without intervention. It is necessary to integrate conventional CAA and MDCT with the clinical presentation of patients to maximize the management of these patients.

Acknowledgment

The authors will like to acknowledge the support and contribution of National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan and Karachi Institute of Heart Diseases, Karachi, Pakistan.

References

1) Ogden JA. Congenital anomalies of the coronary arteries. Am J Cardiol. 1970;25(4):474-9.
2) Roberts WC. Major anomalies of coronary arterial origin are seen in adulthood. Am Heart J. 1986;111(5):941-63.
3) Keswani AN, Dann K, Ramee S. Anomalous right coronary artery: a case report. Ochsner J. 2014;14(2):287-91.
4) Furui M, Sakaguchi S, Akhtar KMA, Imran M, Kakii B, Uchino G, Asanuma M, Yoshida T. The surgical intervention of thoracic aortic aneurysm among octogenarians and over: A Single center study. IJEHSR. 2020;8(1):04-2.
5) Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. Cathet Cardiovasc Diagn. 1990;21(1):28-40.
6) Marchesini J, Campo G, Righi R, Benea G, Ferrari R. Coronary artery anomalies presenting with ST-segment elevation myocardial infarction. Clin Pract. 2011;1(4):e107.
7) Al-Badawi M, Ihsan M, Garcia AN, Dogar M, Celenza-Salvatore J, McFarlane SI. Congenital Absence of Left Main Coronary Artery with Anomalous Origin of Left Anterior Descending and Left Circumflex Arteries Presenting with Acute Non-ST Elevation Myocardial Infarction. Am J Med Case Rep. 2019;7(10):264.
8) Angelini P. Coronary artery anomalies: an entity in search of an identity. Circulation. 2007;115(10):1296-305.
9) Hauser M. Congenital anomalies of the coronary arteries. Heart. 2005;91(9):1240-5.
10) Angelini P, Velasco JA, Flamm S. Coronary anomalies: incidence, pathophysiology, and clinical relevance. Circulation. 2002;105(20):2449-54.
11) Gersony WM. Management of anomalous coronary artery from the contralateral coronary sinus. J Am Coll Cardiol. 2007;50(21):2083-4.