Severely ectatic left circumflex coronary artery presenting with an ST-elevation myocardial infarction: A case report

Saifuldeen Al-Qaisi, Shirin Nafisi, Sina Nafisi

ABSTRACT

Introduction: Coronary artery ectasia (CAE) is a very rare condition with unclear etiology, clinical significance, and proper management strategies.

Case Report: A 54-year-old male who had an ST-elevation myocardial infarction (STEMI) as an initial presentation of a significantly ectatic left circumflex coronary artery (LCX) with a diameter of 8mm. The patient presented to the hospital with chest pain. Upon further evaluations, he was deemed to be having an STEMI noted in the lateral EKG leads in addition to elevated troponin I level. The patient underwent left heart catheterization which revealed an ectatic LCX with a diameter close to 8 mm, with an acute thrombus and occlusion of the distal LCX and severe atherosclerosis. Percutaneous coronary intervention was done to re-establish flow to the obtuse marginal artery (OM). Subsequently, patient underwent coronary artery bypass grafting two days later. He was discharged home three days after surgery in stable condition on aspirin and clopidogrel.

Conclusion: This case is unique as it describes a significantly aneurysmal LCX which is very wide in diameter complicated with an intraluminal thrombus without a prior warning in this patient, all managed successfully. Literature provides limited information regarding optimal management of similar conditions.

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Introduction: Coronary artery ectasia (CAE) is a very rare condition with unclear etiology, clinical significance, and proper management strategies. **Case Report:** A 54-year-old male who had an ST-elevation myocardial infarction (STEMI) as an initial presentation of a significantly ectatic left circumflex coronary artery (LCX) with a diameter of 8mm. The patient presented to the hospital with chest pain. Upon further evaluations, he was deemed to be having an STEMI noted in the lateral EKG leads in addition to elevated troponin I level. The patient underwent left heart catheterization which revealed an ectatic LCX with a diameter close to 8 mm, with an acute thrombus and occlusion of the distal LCX and severe atherosclerosis. Percutaneous coronary intervention was done to re-establish flow to the obtuse marginal artery (OM). Subsequently, patient underwent coronary artery bypass grafting two days later. He was discharged home three days after surgery in stable condition on aspirin and clopidogrel. **Conclusion:** This case is unique as it describes a significantly aneurysmal LCX which is very wide in diameter complicated with an intraluminal

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Keywords: Coronary artery, Left circumflex artery, STEMI, Coronary artery ectasia

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INTRODUCTION

Coronary artery ectasia (CAE), defined as local or generalized aneurysmal dilatation of the coronary arteries to 1.5 times or more of the normal diameter of a coronary vessel, is a rare disease occurring in 0.3–4.9% of people in North America [1]. The condition is commonly asymptomatic and is normally discovered when performing tests for other conditions such as coronary artery disease, stable angina and other acute coronary syndromes [2, 3]. It can also go unnoticed and not diagnosed for many years. When identified, CAE is most commonly seen in males, the elderly and people with high BMIs [1]. Amongst symptomatic patients, chest pain and dyspnea on exertion are the most common complaints leading to hospital admission. Coronary artery ectasia

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etiology, clinical significance and optimal management are yet unclear. In this case, we report a 54-year-old male with a significantly ectatic left circumflex coronary artery with a diameter of approximately 8 mm, who presented with chest pain and was diagnosed with ST-elevation myocardial infarction (STEMI) as a first presentation of this disease entity.

CASE REPORT

We report a 54-year-old male with no significant past medical history, who presented to our hospital with one-hour history of sub-sternal chest pain. Symptoms started 1 hour earlier suddenly while the patient was at home. His chest pain was reported to be pressure like in quality, 10/10 in severity, located in the substernal area with radiation to the neck, and associated with shortness of breath and acute distress. He denied nausea or vomiting.

On presentation to the hospital, the patient was afebrile with a temperature of 36.7°C, had a blood pressure of 125/88 mmHg, heart rate of 85 bpm, respiratory rate of 16 per minute, and oxygen saturation was 97% on three liters of oxygen by nasal cannula.

On physical examination, the patient was in acute distress. Cardiovascular and pulmonary examinations were unremarkable with normal heart sounds. His chest was clear to auscultation bilaterally. Chest X-ray was negative for acute findings.

The past medical history of the patient was negative for any known chronic diseases. He denied any previous heart disease or surgeries. He was not on any long-term medications. He also denied smoking, alcohol, and illicit drug use.

An EKG was done in the emergency room and showed ST-segment elevation in lateral leads (I, aVL, V5-V6) consistent with STEMI. Troponin I level was 19.08 ng/ml. Subsequently, the patient was diagnosed with STEMI and was emergently transferred to the catheterization lab and a left heart catheterization with bilateral selective coronary angiography was performed, which showed extensive aneurysmal disease with ectasia of the proximal LCX with a diameter of ~8 mm with evidence of an acute intraluminal thrombus with a 100% occlusion of the distal circumflex artery, and a high plaque burden in mid-portion. Manual clot removal and angioplasty using a 2.5x12 mm balloon was done, re-establishing flow within the obtuse marginal artery (OM). However, plaque burden could not be removed. He was transferred to the intensive care unit and was started on eptifibatide and heparin drips in anticipation of a coronary artery bypass grafting surgery (CABG), and thoracic surgery service was consulted for further management. Meanwhile, the patient had an episode of sustained ventricular tachycardia (VT) and was given a bolus of 150 mg of amiodarone intravenously and was started on amiodarone infusion for 24 hours which

successfully terminated the VT. He was then switched to 400 mg of amiodarone orally twice daily after finishing the infusion. Two days after initial presentation, he was taken to the operation room undergoing CABG using reversed saphenous venous graft to the OM. He had a patent foramen ovale (PFO) closure as well.

The patient survived both procedures and did well. He was transferred later back to the medical floor and his vital signs remained stable and he remained symptom free. He was discharged home three days later on aspirin, and clopidogre and in a stable condition.

DISCUSSION

Coronary artery ectasia is a variant of coronary artery abnormality. It may be congenital or acquired [3]. It is characterized by an increased vessel wall stress and, thinning of the arterial wall which causes progressive dilation and remodeling of the vessel. In a study of 10,057 patients, the prevalence of CAE was 1.5% [4]. Compared to the normal individuals, the patients with CAE are older, more frequently male (4 times more common in males than in females), and have higher rates of myocardial infarction (MI) [1, 5, 6]. Coronary artery ectasia is commonly found in patients with atherosclerosis and coronary artery disease, but the condition can occur by itself without an identifiable cause and in both cases it can cause medical and health problems.

The incidence of this condition is increased with Marfan and Kawasaki diseases as well as with multiple inflammatory and infectious diseases [7]. It can also be found transiently in patients that have undergone stent placement resulting in the stretching of the vessels [2]. The permanent dilation of the artery is thought to be mainly caused by inflammation, triggered by

Figure 1: Coronary angiogram showing (A) The initial image represents the left coronary system in postero anterior (PA) caudal view. In the proximal circumflex artery, there is extensive aneurysmal disease with ectasia and evidence of acute thrombus with 100% occlusion of a distal circumflex artery. (B) In the post intervention view, there appears to be an obtuse marginal artery distal to the aneurysmal circumflex artery of normal caliber vessel with no evidence of disease.

disease, chemicals, or physical stress of the vessel. The inflammatory response results in an over expression of matrix metalloproteinases, cysteine proteinases, and serine proteinases that causes the partial breakdown of the vessel and weakens it [2, 8]. The inflammation response will also trigger platelet activation which increases the risk of blood clots and can potentially cause a vessel blockage, as seen in this patient. The risk of blood clots also increases due to the turbulent blood flow of the enlarged vessel which can activate platelets and form clots [9]. In coronary artery ectasia, the inflammation related elevated oxidative stress is increased, and antioxidant activity is depressed in. This imbalance can cause damage to the cells of the vessel and cause them to die, weakening the vessels further [10]. The activation of the inflammatory response also causes a detectable increase in C-reactive protein, interleukin-6, tumor necrosis factor alpha and cell adhesion molecules, which can be used as diagnostic markers as was shown in a study of 36 cases of CAE which showed increases in TNF-Alpha and IL-6 levels compared to controls [5, 10]. Decreases in blood coronary blood flow can lead to ongoing ischemia, and increases the chance of developing large weak spots in the affected coronary arteries, or aneurysms that can rupture and result in death.

Coronary artery ectasia as a result can cause myocardial tissue ischemia resulting from decreased coronary blood flow. This will happen either due to a blood clot, spasm of the vessel, or a combination of these two and other factors.

The disease is usually asymptomatic and is discovered incidentally during workup for other conditions such as coronary artery disease, stable or unstable angina and other cardiac conditions [1]. When symptomatic, chest pain and dyspnea on exertion are the common symptoms [11].

To diagnose and discover the extent and severity of coronary artery ectasia there are a variety of diagnostic tools used. The most common method for discovering the disease is through angiography. By using angiography clinicians are able to demonstrate the size, location and number of vessels affected by the disease. It can also be demonstrated through other methods such as intravascular ultrasound, and magnetic resonance imaging (MRI) [12]. It has been discovered that the disease normally occurs most often in the right coronary artery, followed by the left anterior descending artery, and finally the left anterior circumflex artery [1].

Using the diagnostic methods mentioned earlier, Coronary artery ectasia can be divided into four different types: Type 1) diffuse ectasia in 2–3 different vessels, Type 2) diffuse disease in 1 vessel and local disease in another, Type 3) diffuse disease in one vessel and Type 4) localized or segmental ectasia [1].

In one study of thirty-three patients with coronary artery ectasia/aneurysm (ranging from one to three vessels) but without significant stenosis, coronary artery ectasia/aneurysm was considered to lead to exercise

induced ischemia, especially in the diffuse form of CAE [12]. In another study, 4993 consecutive coronary arteriograms were reviewed to identify patients with CAE and to allow the assessment of their progress over six years. Coronary ectasia was a relatively uncommon finding (overall incidence 1.4%) [5]. It was not related to the development of aortic aneurysms and did not affect the clinical outcome, results of coronary artery surgery, or symptoms [5].

The treatment of coronary artery ectasia normally goes hand in hand with therapies of other heart disorders such as atherosclerosis and hypertension. To prevent the formation of blood clots and the blockage of the vessels, patients are commonly placed on anticoagulant and antiplatelet therapy, as well as anti-spasm therapy with calcium channel blockers such as amlodipine [1]. Stains and ACE inhibitors have also been used [13]. Yet, there are no set guidelines to date regarding the treatment strategy of this condition and when to consider surgical intervention as opposed to medical management.

CONCLUSION

This case is considered unique as it describes a significantly aneurysmal left circumflex coronary artery that rarely reported to be that dilated, complicated with an intraluminal thrombus with a 100% distal occlusion causing an ST-elevation myocardial infarction (STEMI) in a middle aged male patient, all managed very successfully with initial percutaneous coronary intervention (PCI) and then surgery with good final outcome. Literature provides limited information regarding optimal management or screening of similar conditions. Better understanding of the pathogenesis involved in Coronary artery ectasia is needed to provide further insight into the clinical significance and direct implications in the management/follow-up strategy of this condition.

Author Contributions

Saifuldeen Al-Qaisi – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Shirin Nafisi – Substantial contributions to conception and design, Acquisition of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Sina Nafisi – Substantial contributions to conception and design, Acquisition of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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