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Case Report

Anomalous Trifurcation of the Left Main Coronary Artery: A Case Report

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ABSTRACT

Coronary artery anomalies are rare with an incidence rate < 1%. The presentation varies considerably. We present the case of an anomalous left atrial branch from the left main coronary artery without independent clinical manifestations. ***(Iranian Heart Journal 2017; 17(4): 53-56)***

Keywords: Coronary artery anomaly● Coronary angiography● Diagnosis

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Anomalies originating from the coronary arteries are extremely rare, with an incidence ranging from 0.17% to 1.3% in autopsy and angiographic findings, respectively. [1, 2] The anomalies can manifest with a wide range of symptoms, including arrhythmias, myocardial infarction, and even in some cases sudden death—especially in the congenital anomalies associated with hemodynamic instability. [3, 4] The left main coronary artery (LMCA) bifurcates into 2 main branches: the left anterior descending artery (LAD) and the left circumflex artery (LC_x). The left atrial coronary artery branches form the LC_x. [5]

We describe a 54-year-old woman, who presented with an unusual trifurcation of the LMCA.

CASE REPORT

The case presented herein is a 54-year-old woman, a known case of hypertension, who referred with chief complaints of dyspnea and epigastric pain from 7 days prior to her admission. The epigastric pain and dyspnea had an on-and-off pattern, until the day prior to her admission, on which she had an exacerbation of symptoms and referred for treatment.

In her past medical history, the patient mentioned a history of hypertension, for which she was on antihypertensive medication (losartan 25 mg twice a day). She had a family history of coronary artery disease in her sister.

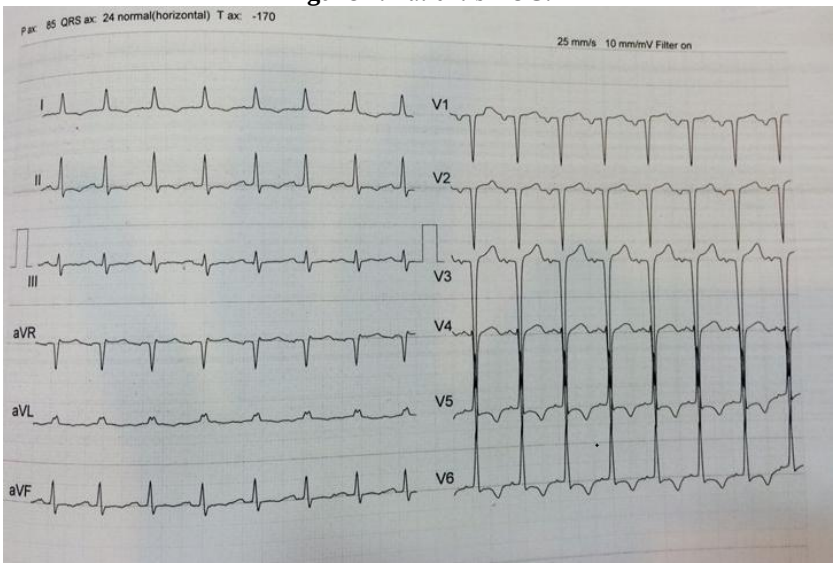
The patient on presentation was anorexic and had dyspnea and dry coughs. On admission, she had a blood pressure of 165/120 mm Hg (bilateral), pulse rate of 116 bpm, respiratory rate of 25 bpm, and temperature of 37°C. Physical examination revealed an apical systolic murmur of mitral regurgitation and an S_3 gallop at the apex. Routine lab data

revealed normal results, including hemoglobin and creatinine.

In her hospital workup, the patient underwent echocardiography, which showed an ejection fraction of 15%–20%, moderate-to-severe pulmonary artery hypertension, and severe mitral regurgitation. Two weeks after her initial hospitalization, she underwent transesophageal echocardiography, which revealed a severely enlarged left ventricle with global hypokinesia, left ventricular ejection fraction of 25%, mild functional mitral valve regurgitation due to annular dilation, mild tricuspid regurgitation with a pulmonary arterial pressure of 30–35 mm Hg, and a normal-sized right ventricle with a preserved right ventricular function.

The ECG of the patient was in favor of coronary artery disease (Fig. 1).

Figure 1. Patient's ECG.



The patient also underwent coronary angiography through the right femoral approach, which revealed 2-vessel disease. She had nonobstructive coronary artery disease in the LAD, right coronary artery (RCA), and LC_x as well as significant ostial disease in the diagonal and obtuse marginal branches. Angiographic evaluation showed an unusual left atrial branch, originating from the mid shaft of the LMCA, which traveled through the left atrium (Supplement 1).

Recommendation:

Medical follow-up for coronary artery disease and transesophageal echocardiographic evaluation for mitral regurgitation should be undertaken.

Afterload reduction with vasodilators and diuretic therapy for congestive symptoms were commenced. The patient's symptoms significantly improved with medical therapy. Informed consent was taken before angiography.

DISCUSSION

The distribution and prevalence of anomalies related to the coronary arteries differ worldwide, and they are most commonly believed to be related to genetic factors.

Categories and Symptoms

The anomalies related to the coronary system can be divided into 3 different types based on the anatomy of the coronary arteries: those with an anomalous origin, those with an

unusual course, and those with a coronary artery fistula. [6]

In another classification, based on the pathophysiology of the coronary arteries, the anomalies are classified into 4 classes. Class I comprises the anomalies that are associated with few or no symptoms and are usually clinically silent. Class II is associated with a high chance of myocardial ischemia and is clinically loaded. Class III is associated with sudden death in young adults and athletes, and Class IV contains those that are associated with higher risks for coronary artery disease. [7]

The anomalies of the coronary arteries may present with different symptoms, ranging from a set of life-threatening manifestations such as the symptoms seen in patients with the anomalous origin of the coronary arteries from the pulmonary artery, to mild and sometimes asymptomatic manifestations—as seen in patients with the anomalous origin of the RCA or the LMCA from the ascending aorta. [8, 9]

The anomalies of the coronary arteries are usually associated with other congenital heart problems such as the Hurler syndrome, the Friedrich ataxia, tetralogy of Fallot, and other congenital diseases. [7]

Diagnosis

There are different diagnostic modalities for the detection of the anomalies of the coronary system. Up to this date, the gold standard for the diagnosis of these anomalies is still conventional coronary angiography. [10]

Recently, some other diagnostic methods have been introduced; they include magnetic resonance angiography, transthoracic echocardiography, multislice computed tomography, and electron beam tomography. [7]

To the best of our knowledge, only 1 other case of an anomalous left atrial branch form the LMCA has been reported. [5]

Our patient displayed a new type of anomaly, which was in the category of anomalies related to the origin (ectopic coronary origin). [6] Our patient presented with some symptoms unrelated to this condition.

CONCLUSIONS

Understanding the anomalies related to the coronary symptoms and their specific clinical manifestations assists in correct decision-making for this group of patients. The anomalous trifurcation of the LMCA is especially important during ablation in patients with atrial fibrillation.

REFERENCES

1. Graidis C, Dimitriadis D, Karasavvidis V, Dimitriadis G, Argyropoulou E, Economou F, et al. Prevalence and characteristics of coronary artery anomalies in an adult population undergoing multidetector-row computed tomography for the evaluation of coronary artery disease. BMC cardiovascular disorders. 2015;15(1):112.

2. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. Catheterization and cardiovascular diagnosis. 1990;21(1):28-40.

3. Datta J, White CS, Gilkeson RC, Meyer CA, Kansal S, Jani ML, et al. Anomalous coronary arteries in adults: depiction at multi-detector row CT angiography. Radiology. 2005;235(3):812-8.

4. de Jonge GJ, van Ooijen PM, Piers LH, Dikkers R, Tio RA, Willems TP, et al. Visualization of anomalous coronary arteries on dual-source computed tomography. European radiology. 2008;18(11):2425-32.

5. Gholoobi A. Anomalous Origin of the Left Atrial Branch from the Left Main Trunk. The Journal of Tehran University Heart Center. 2015;10(2):113-4.

6. Laspas F, Roussakis A, Mourmouris C, Kritikos N, Efthimiadou R, Andreou J. Coronary artery anomalies in adults: imaging at dual source CT coronary angiography. Journal of medical imaging and radiation oncology. 2013;57(2):184-90.

7. Cademartiri F, Runza G, Luccichenti G, Galia M, Mollet NR, Alaimo V, et al. Coronary artery anomalies: incidence, pathophysiology, clinical relevance and role of diagnostic imaging. La Radiologia medica. 2006;111(3):376-91.

8. Kim SY, Seo JB, Do K-H, Heo J-N, Lee JS, Song J-W, et al. Coronary Artery Anomalies: Classification and ECG-gated Multi–Detector Row CT Findings with Angiographic Correlation 1. Radiographics. 2006;26(2):317-33.

9. Montaudon M, Latrabe V, Iriart X, Caix P, Laurent F. Congenital coronary arteries anomalies: review of the literature and multidetector computed tomography (MDCT)-appearance. Surgical and Radiologic Anatomy. 2007;29(5):343-55.

10. Mainwaring RD, Lamberti JJ. Pulmonary atresia with intact ventricular septum. Surgical approach based on ventricular size and coronary anatomy. The Journal of thoracic and cardiovascular surgery. 1993;106(4):733-8.