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Case Report

All in One: Anomalous Coronary Arteries Arising from the Right Cusp

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Abstract

Background: Coronary artery anomaly (CAA) refers to structural abnormalities affecting the coronary arteries and, in most cases, are rare congenital defects affecting almost 1% of the general population. These malformations can vary in presentation, ranging from benign variations to potentially life-threatening anomalies. Anomalous coronary arteries arising exclusively from the right coronary cusp (RCC) represent a rare occurrence with an estimated incidence of approximately 0.03-0.2% in the general population.

Case Report: We are presenting a case of a 73-year-old male with a past medical history of coronary artery disease with prior coronary artery bypass surgery who came to the emergency department with chest pain. Given his ongoing symptoms, he was taken urgently to the Cardiac Cath Lab. He was found to have anomalous coronary arteries, all arising from the right coronary cusp. He has a chronic total occlusion of the right coronary artery (RCA) at the proximal segment with the faint right to right collaterals coming from the RV branch, 100% circumflex occlusion, with the left anterior descending artery (LAD) coming off from the proximal RCA that was diffusely diseased but patent, he had an antegrade filling and competitive flow from the left internal mammary artery (LIMA).

Conclusion: Understanding this anomaly's anatomical variations and potential hemodynamic consequences is crucial for accurate diagnosis, appropriate management, and optimizing patient outcomes. Management strategies for coronary artery malformation depend on the specific anatomical and functional characteristics and the presence or absence of symptoms. Treatment options may include medical management, lifestyle modifications, interventional procedures, or surgical intervention.

Keywords: anatomy; cardiology; chest pain; and coronary vessels

Introduction

Coronary artery anomaly (CAA) refers to structural abnormalities affecting the coronary arteries and, in most cases, are rare congenital defects affecting almost 1% of the general population. [1-6] These malformations can vary in their presentation, ranging from benign variations to potentially life-threatening anomalies [7]. Anomalous coronary arteries arising exclusively from the right coronary cusp (RCC) represent a rare occurrence with an estimated incidence of approximately 0.03-0.2% in the general population [8]. In this intriguing anomaly, all coronary arteries, including the left main coronary artery (LMCA), left anterior descending artery (LAD), and circumflex artery (CX), originate from the RCC, deviating from the usual anatomical distribution [9]. Understanding this condition's unique anatomical variations and potential hemodynamic consequences is essential for accurate diagnosis, appropriate management, and optimizing patient outcomes.

Case Presentation:

A 73-year-old male with a past medical history of coronary artery disease with prior coronary artery bypass surgery came to the emergency department with chest pain. He had ongoing symptoms for approximately 4 to 5 days before the presentation. Initial troponin was 2.43, and EKG showed diffuse ST segment depression. Given his ongoing symptoms, he was taken urgently to the Cardiac Cath Lab. He was found to have anomalous coronary arteries, all arising from the right coronary cusp. He has a chronic total occlusion of the right coronary artery (RCA) at the proximal segment with the faint right to right collaterals coming from the RV branch, 100% circumflex occlusion, with the left anterior descending artery (LAD) coming off from the proximal RCA that was diffusely diseased but patent, he had an antegrade filling and competitive flow from the left internal mammary artery (LIMA). All 3 vein grafts were occluded. The vein graft to the RCA was occluded at the ostium, which was likely the culprit for the non-ST-elevation myocardial infarction. The intervention was attempted on the vein graft to the RCA, with attempted thrombectomy and balloon angioplasty, but failed to restore flow through the graft. The patient was admitted to the surgical ICU with an intra-aortic balloon pump in place. Given that he would need CTO intervention to the native right coronary artery, he was transferred to a higher level of care for intervention.

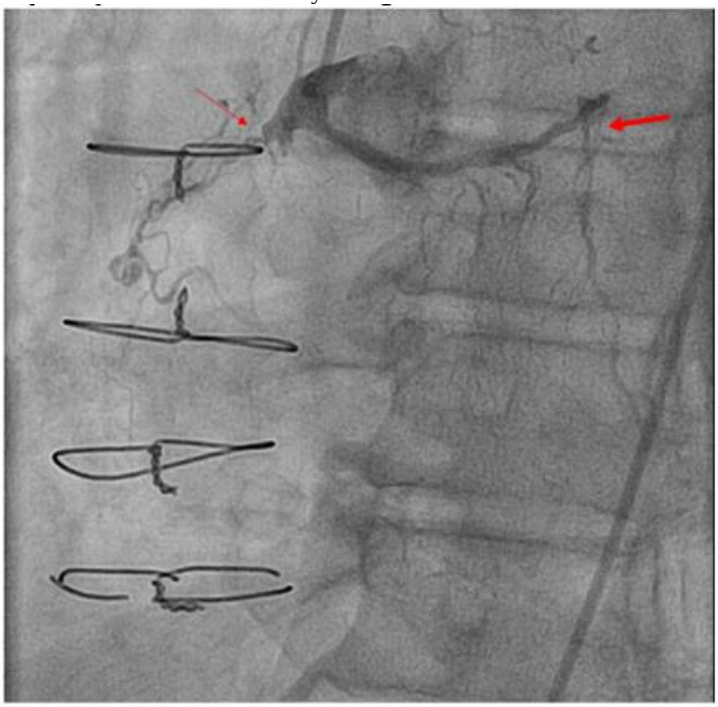

Figure 1: LAO 22^{O} CRA 1.3^{0} view showing total of the native RCA (thin arrow) LAD arising from proximal RCA (think arrow)

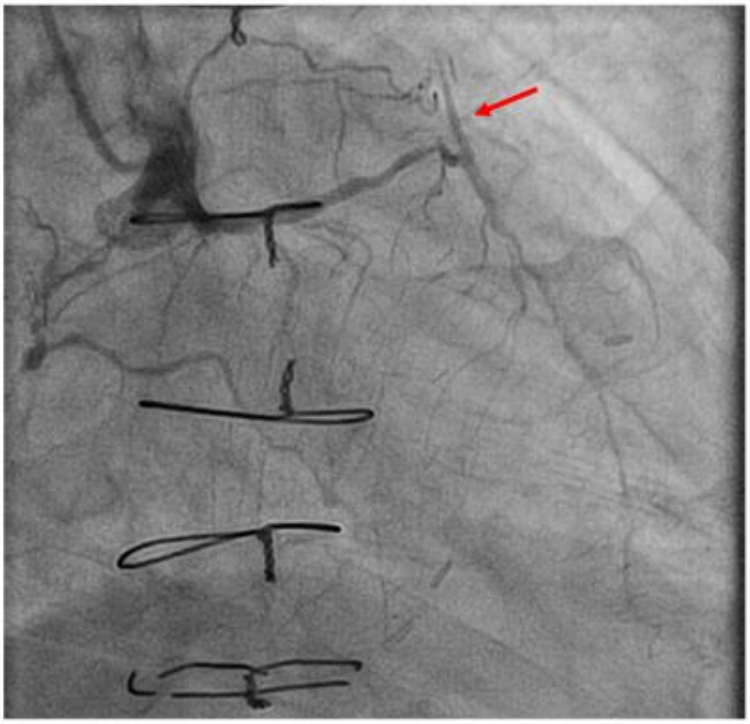

Figure 2: RAO 27.2^0 CRA 3.0^0 view showing antegrade filling of the LIMA graft

Discussion:

Coronary artery malformation encompasses structural abnormalities affecting the coronary arteries, essential for supplying oxygenated blood to the heart muscle [6]. These malformations

exhibit a broad spectrum of presentations, ranging from benign variations to potentially life-threatening anomalies [10]. A comprehensive understanding of coronary artery malformation is paramount in facilitating accurate diagnosis, implementing appropriate management strategies, and ultimately improving patient outcomes.

The aetiology and pathogenesis of coronary artery malformation are multifactorial and complex. While some cases may be congenital, others may develop due to acquired conditions or genetic predisposition. These anomalies can involve various aspects of coronary artery anatomy, including anomalies in origin, course, branching patterns, and luminal narrowing or dilation [9].

The clinical manifestations of coronary artery malformation can vary widely, ranging from asymptomatic individuals to those experiencing symptoms such as chest pain, shortness of breath, or even life-threatening cardiac events. Timely diagnosis through various imaging modalities, including coronary angiography, computed tomography angiography (CTA), or magnetic resonance imaging (MRI), is crucial for accurate characterization and appropriate management [10].

Management strategies for coronary artery malformation depend on the specific anatomical and functional characteristics and the presence or absence of symptoms. Treatment options may include medical management, lifestyle modifications, interventional procedures, or, in severe cases, surgical intervention [11].

Conclusion:

Understanding this anomaly's anatomical variations and potential hemodynamic consequences is crucial for accurate diagnosis, appropriate management, and optimizing patient outcomes. Management strategies for coronary artery malformation depend on the specific anatomical and functional characteristics and the presence or absence of symptoms. Treatment options may include medical management, lifestyle modifications, interventional procedures, or surgical intervention.

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Patient permission/consent declarations:

It is not applicable as the patient's name or any identification is not mentioned in our case

Conflict of Interest statement :

None Declared

References:

1. Baltaxe HA, Wixson D. (1977).The incidence of congenital anomalies of the coronary arteries in the adult population. Radiology.; 122: 47–52.
2. Click RL, Holmes DR, Jr, Vlietstra RE, et al. (1989).Anomalous coronary arteries: location, degree of atherosclerosis and effect on survival: a report from the Coronary Artery Surgery Study. J Am Coll Cardiol.; 13: 531–537.
3. Yamanaka O, Hobbs RE. (1990).Coronary artery anomalies in 126,595 patients undergoing coronary angiography. Cathet Cardiovasc Diagn; 21: 28–40.
4. Moscucci M. Grossman and Baimâs (2005).Cardiac Catheterization, Angiography, and Intervention. 8th Edition. Lippincott Williams Wilkins (LWW);335-353
5. Angelini P, Villason S, Chan AV, Diez JG. (1999). Normal and anomalous coronary arteries in humans. Coronary Artery Anomalies: A Comprehensive Approach. Philadelphia: Lippincott Williams Wilkins; 27-150.
6. Angelini P. (2007).Coronary artery anomalies: an entity in search of an identity. Circulation.;115(10):1296-1305.
7. Brothers JA, Frommelt MA, Jaquiss RD, et al. (2017).Expert consensus guidelines: Anomalous aortic origin of a coronary artery. J Thorac Cardiovasc Surg. 153(6):1440-1457.
8. Angelini P, Velasco JA, Flamm SD. Coronary anomalies: incidence, pathophysiology, and clinical relevance. Circulation. 2002;105(20):2449-2454.
9. Maron BJ, Doerer JJ, Haas TS, Tierney DM, Mueller FO. (2009).Sudden deaths in young competitive athletes: analysis of 1866 deaths in the United States, 1980-2006. Circulation;119(8):1085-1092.
10. Warnes CA, Williams RG, Bashore TM, et al. (2008).Circulation.;118(23):e714-833.
11. Gibson CM, Ryan KA, Murphy SA, et al. (2019).Impaired coronary blood flow in non-culprit arteries in the setting of acute myocardial infarction. JACC Cardiovasc Interv.;12(18):1817-1827.

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