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Currently 382/500 words (excluding spaces)

Title: Exploring a Unique Coronary Artery Anomaly in a Patient with Atypical Chest Pain: A Diagnostic Challenge

Introduction (46 words):

The case report describes a young female presenting with chest pain, who was subsequently diagnosed with an unreported variant of the left main coronary artery. This case points to the diagnostic dilemmas of this unique coronary anatomy and the complicated clinical interpretation and management that follow.

Case (160 words):
A 44-year-old female with a history of hypertension and type II diabetes mellitus presented with episodic, severe, band-like chest pain radiating to her back. Initially exercise-induced, over the past year the pain had progressed to occur at rest and awaken her from sleep, one to two times daily, lasting about 20 minutes. High sensitivity troponin T levels never exceeded 14 ng/L. Patient had poor functional capacity on stress echocardiography. She underwent cardiac catheterization which revealed a right-dominant coronary system with the LMCA anomalously originating from the right coronary cusp. No stenosis was seen with Dual-Axis Rotational Coronary Angiography. Furthermore, coronary CT Angiography demonstrated the LMCA coursing low interarterial between the aortic root and the right ventricular outflow tract (RVOT), without any high-risk features such as stenosis, myocardial bridging, or a slit-like orifice. A multidisciplinary discussion decided against intervention, and the patient is currently under medical management and close outpatient monitoring to evaluate for other non-cardiac causes of the chest pain.

Discussion (176 words):
The anomalous origins of the LMCA from the right coronary cusp is considered extremely rare that can lead to severe complications, including sudden cardiac death [1]. Traditionally, it has been divided into four categories based on its anatomical relationship to the aorta and pulmonary trunk: posterior, interarterial, anterior, and septal courses [2]. The interarterial course between aorta and pulmonary trunk and high-risk features such as slit-like orifice has been previously reported to cause sudden cardiac death. However, this case presents a unique anatomical variant of LMCA between the aortic root and RVOT without high-risk features such as slit-like orifice. This has not been described in the literature and not covered by AHA guidelines.

In this case, the LMCA appears to be structurally unique, although not the cause of this patient's chest pain. While coronary anomalies are often associated with ischemic symptoms, no such relation could be established in this case. This case underlines the importance of a thorough

diagnostic approach, since coronary anomalies, while clinically interesting, are not always the cause of symptoms like chest pain.

References

1. Gentile F, Castiglione V, De Caterina R. Coronary artery anomalies. *Circulation*. 2021;144(12):983-996. doi:10.1161/circulationaha.121.055347

2. Ropers D, Gehling G, Pohle K, et al. Anomalous course of the left main or left anterior descending coronary artery originating from the right sinus of Valsalva. *Circulation*. 2002;105(6). doi:10.1161/hc0602.102020