



Anomalous origin of the left coronary artery from the right sinus: an interesting and very rare coronary anomaly circulation

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Abstract: Coronary artery anomalies (CAA) are congenital changes in their course, origin and/or structure. Most of them are incidentally discovered during autopsies or angiographic studies. We present the case of a 48-year-old woman with high-risk unstable angina whose coronary angiogram revealed an interesting and extremely rare coronary anomaly circulation pattern.

Keywords: Anomalous origin of the left coronary artery (anomalous origin of the LCA); coronary artery anomalies (CAA); coronary angiography

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Introduction

Coronary artery anomalies (CAA) are a diverse group of congenital disorders, with highly variable manifestations and pathophysiological mechanisms. Several controversies remain in terms of its classification, incidence, heredity, screening and treatment. The anomalous origin of the left coronary artery (LCA) is a very rare subset of CAA (1-4).

Case presentation

A 48-year-old woman, active, Caucasian, with known hypertension and type 2 diabetes presented to the emergency department complaining of typical, persistent and at rest chest pain, completely relieved after sublingual nitrates. Her electrocardiograms showed normal sinus rhythm and electrical inactivity at leads V1-3 and the serial cardiac troponin were all negative. She denied previous episodes of stroke, myocardial infarction, coronary artery disease (CAD) as well as familiar or personal histories of sudden cardiac death. Following the risk stratification protocol, the invasive strategy was indicated and the coronary angiogram was, then, requested. The right

coronary artery (RCA) showed no lesions, with a normal/topic origin. Surprisingly, the LCA arised from the right coronary sinus, very close to the RCA ostium, with a typical retroaortic course, and reached the anterior intraventricular groove and left atrioventricular groove, following, respectively, the expected courses of the left anterior descending (LAD) and the left circumflex (LCx) arteries (*Figures 1,2*). The LAD showed a diffuse and severe atherosclerotic narrowing, not feasible neither to percutaneous coronary intervention nor to bypass grafting surgery. Moderate narrowings were either detected at the distal portion of the left main and at the proximal part of the obtuse marginal branch. Non-selective injections of contrast media into the left coronary sinus and orthogonal aortograms revealed no emergent arteries, thus confirming the ectopic and anomalous origin of the LCA from the right coronary sinus (*Figure 1*). The left ventricle showed a preserved global contractility, with some anterior wall hypokinesia. After the session with the heart team, it was decided to adopt the non-interventional approach, with optimal medical treatment, as recommended by the guidelines. There was neither recurrence of angina nor any major adverse cardiac or cerebrovascular events.



Figure 1 Coronary angiogram showing the LCA arising from the right sinus, very close to the RCA ostium, then following the expected courses of the LAD and the LCx. Non-selective injections into the left sinus revealed no emergent arteries, thus confirming the ectopic and anomalous origin of the LCA from the right sinus. LCA, left coronary artery; RCA, right coronary artery; LAD, left anterior descending; LCx, left circumflex.



Figure 2 Coronary angiograms, in different views, showing the anomalous LCA arising from the right sinus, very close to the RCA ostium, then following the expected courses of the LAD and the LCx (5). LCA, left coronary artery; RCA, right coronary artery; LAD, left anterior descending; LCx, left circumflex.

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Discussion

CAA are congenital changes in their course, origin and/or structure. Several controversies remain in terms of its classification, incidence, heredity, screening and treatment. Despite mostly asymptomatic, clinical presentation in adults may result from myocardial ischemia, manifesting as syncope, angina, arrhythmias and even sudden cardiac death. In apparently healthy young athletes, they are the second most frequent cause of sudden death (1-3).

Most CAA are incidentally discovered during autopsy

or coronary angiographic studies, with an incidence rate of 0.64% to 1.3% (1-3).

In a recent review (4) of the 2,572 patients submitted to multi-detector-row computed tomography (MDCT), 2.33% were diagnosed with CAA. High take-off of the RCA was seen in 0.62%, of the left main in 0.08% and both of them in 0.08%. Separate origin of the LAD and LCx from left sinus of Valsalva was found in 0.58%. In 0.35% the RCA arose from the opposite sinus of Valsalva with a separated ostium. In 0.23% an abnormal origin of LCx from the right sinus was found with a further posterior course within the atrioventricular groove. A single coronary artery was seen in 0.12%. It originated from the right sinus in 0.04% and from the left sinus in 0.08%. Like in the case reported here, only in 0.08% of the patients the LCA originated from the right coronary sinus, with separated ostium from the RCA. LCA originating from the pulmonary artery was found in 0.04%. Coronary artery fistula was detected in 0.15%.

If the LCA cannot be visualized during angiography, either an ostial total occlusion or its congenital agenesis should be suspected. Like in this case, anomalous origin of the LCA is diagnosed when it is not visualized during left coronary sinus injection in the absence of proximal occlusion, but, instead of, it arises separately from the right sinus of Valsalva or as an extension of the RCA (1-4).

Oliveira *et al.* (6) recently published an unheard association of absence of LCx with superdominant RCA and anomalous origin of the LCA (LAD) from the right coronary sinus.

The MDCT coronary angiography allows noninvasive and accurate depiction of CAA. Unfortunately, in the

present case, due to public health system limitations, the patient was referred to the invasive angiography instead of to the MDCT.

In this present case, due to the angiographic features of the CAD, not feasible for interventional approach, the patient was clinically managed, with satisfactory and event-free short-term evolution.

All cardiac surgeons and interventional cardiologists should be familiar with these anatomic variants since precise recognition of the course and distribution of the coronary arteries is crucial for adequate revascularization strategies in the presence of CAD.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/jxym.2019.01.03>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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References

1. Angelini P. Coronary artery anomalies: an entity in search of an identity. *Circulation* 2007;115:1296-305.
2. Almeida C, Dourado R, Machado C, et al. Coronary artery anomalies. *Rev Port Cardiol* 2012;31:477-84.
3. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn* 1990;21:28-40.
4. Graidis C, Dimitriadis D, Karasavvidis V, 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 Cardiovasc Disord* 2015;15:112.
5. Oliveira MD, Navarro EC, de Sá GA, et al. Coronary angiograms, in different views, showing the anomalous LCA arising from the right sinus, very close to the RCA ostium, then following the expected courses of the LAD and the LCx. *Asvide* 2019;6:028. Available online: <http://www.asvide.com/article/view/29857>
6. Oliveira MD, de Fazio FR, Mariani Junior J, et al. Superdominant Right Coronary Artery with Absence of Left Circumflex and Anomalous Origin of the Left Anterior Descending Coronary from the Right Sinus: An Unheard Coronary Anomaly Circulation. *Case Rep Cardiol* 2015;2015:721536.

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