

Circumflex artery arising from right coronary sinus: An innocent variation or an anomaly that should concern us?

Mavridis S; Murray K; Niemann T*

***Corresponding Author: Niemann Tilo**

Radiology, Kantonsspital Baden Im Ergel 15404 Baden, Switzerland.

Email: Tilo.niemann@ksb.ch

Abstract

Left circumflex artery arising from the right coronary sinus of Valsalva is a rare entity with an incidence of approximately 0.4 to 0.7% [1]. Although is generally considered as not hemodynamically significant, in some cases it may lead to myocardial ischemia or even sudden death [2]. Cardiac angiography is still considered the gold standard for diagnosis. Coronary computed tomography angiography however, as performed in the case, or even transthoracic and transesophageal echocardiography can be used for the diagnosis [2].

Keywords

Coronary artery; Anomaly; Variant; RCX.

Case Description

We present a case of a 56-year-old female patient who presented in the context of stem cell donation with dyspnea on exertion, stage I-II according to NYHA. Due to a positive family history of cardiovascular disease a further work-up was recommended by her physician. Physical examination, blood pressure and ECG were within normal limits. Routine laboratory analysis showed dyslipidemia. An exercise stress test showed no signs of coronary ischemia but only 70% of the maximum predicted heart rate could be reached.

The patient was referred for coronary computed tomography (CT) to rule out coronary artery disease. CT was performed using Siemens DEFINITION Flash CT in cardiac spiral mode with 100 kV tube voltage and 164 mAs tube current. The injection protocol consisted of the administration of 70 ml of a 37% iodinated contrast agent (Iopamiro 370, iopamidol; Bracco, Switzerland) at a flow rate of 5 ml/s with saline chaser flush. Images were reconstructed during the entire cardiac cycle in 0.75 mm contiguous images with I26f vascular kernel.

CT revealed an anomalous origin of the left circumflex artery (RCX) arising from the right sinus of Valsalva 2 mm inferior to the right coronary artery (Figure 1). The RCX followed a posterior retro-aortic course and finally arrived at the left atrioventricular sulcus providing branches to the left ventricular free wall. The right coronary artery and the left anterior descending artery presented the per definition normal courses arriving at the right atrioventricular sulcus and the anterior interventricular sulcus respectively [3]. No calcifications, further unusual angulation or stenosis of the coronary arteries were detected. The patient presented no abnormal extracardial findings.

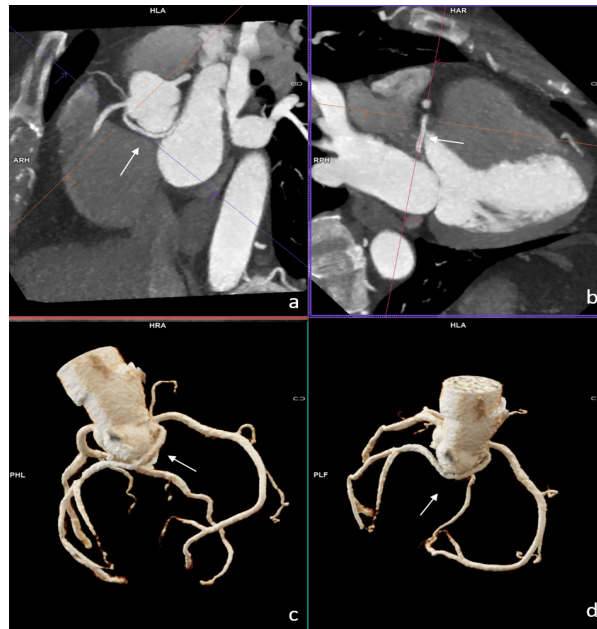


Figure 1: CT coronary angiography. Multiplanar reconstructions (a, b) demonstrating retro-aortic course of the anomalous RCX. Cinematic rendering of the coronaries (c, d) for anatomic overview of the anomaly.

Discussion

The presence of coronary arteries anomalies or variations is estimated up to 1% to 2% in the general population [4]. The left circumflex artery arising from the right sinus of Valsalva is one of them. This entity was described for the first time by Antopol and Kugel in 1933 and the incidence ranges approximately from 0.4% to 0.7% [1,2]. The circumflex artery can arise from a separate ostium located in the right sinus or from a proximal part of the right coronary artery. The circumflex artery follows then a retro-aortic course and arrives in the left atrioventricular sulcus [4].

This anomaly is in most of the cases innocent and Shriki and colleagues classified the entity as not hemodynamically significant [4]. However, there are some cases that are related to myocardial ischemia or even sudden death especially due to artery compression from a dilated aortic root or an unusual angulation. Furthermore, it has been reported that this anomalous variation can complicate heart surgery procedures, especially those at the level of the aortic root [1,2].

In our case we detected the anomaly using a coronary computed tomography angiography, which showed the aberrant circumflex artery from the right sinus of Valsalva, but we did not find any other pathological findings such as stenosis or unusually angulation. In general, specific anatomical high-

risk features of anomalous coronary arteries and their physiological high-risk consequences have been determined according to the current knowledge of the literature [5]. The anomaly did not fulfill any of these. No further action was taken and we considered the anomaly as non-hemodynamically significant.

Conclusion

Prompt recognition of the anomalous left circumflex artery from the right Sinus of Valsalva, easily diagnosed using computed tomography and understanding its underlying pathological mechanisms is crucial to avoid rare complications associated with this rare entity.

Disclosure statement: No financial support and no other potential conflict of interests relevant to this article were reported.

References

1. Citaku H, Kamberi L, Gorani D, Kocinaj D, Krasniqi X. Anomalous Origin of Left Circumflex Artery. *Med Arch*. 2015; 69: 423-4.
2. Yilmaz H, Gungor B, Sahin S, Bolca O. A Case of Anomalous Origin of Circumflex Artery from Right Sinus of Valsalva Recognized by Three-dimensional Transesophageal Echocardiography and Coronary Computed Tomography Angiography. *Heart Views*. 2014; 15: 57-9.
3. Villa AD, Sammut E, Nair A, Rajani R, Bonamini R, Chiribiri A. Coronary artery anomalies overview: The normal and the abnormal. *World J Radiol*. 2016; 8: 537-55.
4. Shriki JE, Shinbane JS, Rashid MA, Hindoyan A, Withey JG, DeFrance A, et al. Identifying, characterizing, and classifying congenital anomalies of the coronary arteries. *Radiographics*. 2012; 32: 453-68.
5. Gräni C, Buechel RR, Kaufmann PA, Kwong RY. Multimodality Imaging in Individuals With Anomalous Coronary Arteries. *JACC Cardiovasc Imaging*. 2017; 10: 471-81.

Manuscript Information: Received: June 22, 2022; Accepted: August 09, 2022; Published: August 10, 2022

Authors Information: Mavridis S¹; Murray K²; Niemann T^{1*}

¹Radiology, Kantonsspital Baden, Switzerland.

²Cardiology, Kantonsspital Baden, Switzerland.

Citation: Mavridis S, Murray K, Niemann T. Circumflex artery arising from right coronary sinus: An innocent variation or an anomaly that should concern us?. *Open J Clin Med Case Rep*. 2022; 1887.

Copy right statement: Content published in the journal follows Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>). © Niemann T (2022)

About the Journal: Open Journal of Clinical and Medical Case Reports is an international, open access, peer reviewed Journal focusing exclusively on case reports covering all areas of clinical & medical sciences.

Visit the journal website at www.jclinmedcasereports.com

For reprints and other information, contact info@jclinmedcasereports.com