Signature: © Pol J Radiol, 2009; 74(1): 73-75

Polish Journal of Radiology
www.PolRadiol.com
CASE REPORT

Received: 2008.11.17
Accepted: 2009.01.12

Computed tomography of coronary artery anomaly – case report

Barbara Paraniak-Gieszczyk, Mariusz Chojnacki, Joanna Gibińska, Marek Konopka

Helimed Diagnostic Imaging, Katowice, Poland

Author's address: Barbara Paraniak-Gieszczyk, Helimed Diagnostic Imaging Sp. z o.o., Panewnicka 65, 40-760 Katowice, Poland, e-mail: barbara.paraniak@helimed.pl

Summary

Background: Anomalies of coronary vessels can be described as varies group of congenital heart disease, which can have different level of clinical manifestation and changeable pathophysiological mechanisms. Diagnosis and imaging of vessel course is essential before percutaneous angioplasty intervention and coronary artery bypass grafting as well as before implantation of artificial valve.

Case Report: Patient with cardiologic history, previously percutaneus intervention were performed and left circumflex coronary artery were assessed as occluded. Computed tomography revealed anomalous origin of patent circumflex branch arising from right Valsava sinus.

Conclusions: Selective percutaneus coronary angiography is challenging in case of coronary anomalies, there are only few indirect symptoms of anomalies. The advantage of computed tomography over classic coronarography is visibility of all patent coronary vessels after single administration of contrast medium. It is possible to describe its anatomic relations, evaluation of walls and its changes.

Key words: coronary artery anomaly • computed tomography angiography • coronarography

PDF file: http://www.polradiol.com/fulltxt.php?ICID=879264

Background

Anomalies of coronary vessels can be described as diverse group of congenital heart disease, which can have different level of clinical manifestation and variable pathophysiological mechanisms [1]. There are discussions on definition and classification of coronary vessels.

Evaluation of anatomy and course of coronary vessels is important in description of vessels tree and supply of myocardium area. Any aberrations cause different clinical effects with levels of intensity. Fainting, vertigos most offen occur among patients with anomalies and risk of sudden cardiac death in case of intense effort is increased – especially among young people [2–5].

Diagnosis and imaging of vessel course is important especially before percutaneous coronary intervention and coronary artery bypass grafting as well as before implantation of artificial valve. Operations of those coronary anomalies have increased risk of complications and can be usually described as time and cost-consuming [6].

Occurrence frequency of inborn vessels anomalies are define between 0.6 and 1.2% of population [7], but real number is hard to define because of different definitions and selection of examined population with ischemic heart disease, in which frequency is evaluate. In some research works the frequency of anomalies is determined to be 5.6% (the group includes double coronary artery, lack of trunk of left coronary artery or coronary fistulas) [8].

Case Report

The aim of this article is to describe possibilities of computed tomography as diagnostic method on the example of patient with coronary anomaly undetected in previous classical coronarography.

A 53 years-old patient, male, experienced myocardial infarction of inferior wall four years prior to evaluation, suffered from occasional retrosternal pains, referred to our institution for control evaluation of coronary vessels. Three years earlier selective coronarography was conducted (in urgent procedure), because of significant stenosis in right coronary artery (RCA) stent was implanted.

Figure 1. Volume rendering image. Medial pat of left circumflex branch (LCX) is seen in coronary sulcus.

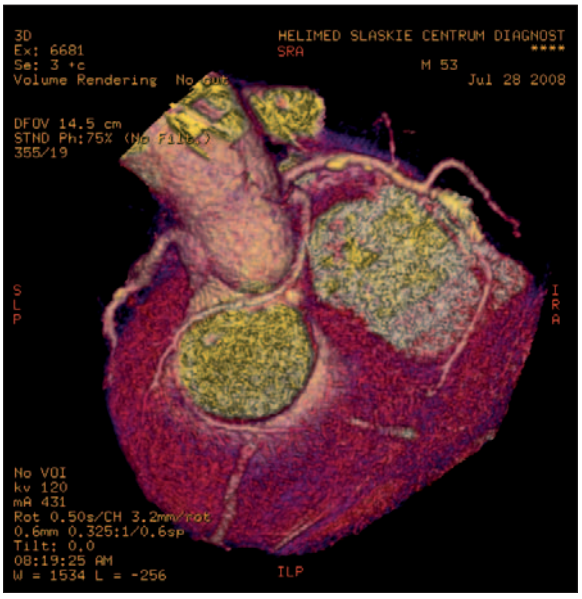

Figure 2. Volume rendering image. The anomalous origin of circumflex branch (placed lower to the right coronary artery) from right Valsava sinus.

Occlusion of the left circumflex artery (LCX) in orifice and collateral circulation from right coronary artery to its distal part was described. Computed tomography angiography of coronary arteries with ECG gating was performed in our unit, 90 ml of contrast medium was intravenously administrated. It revealed anomalous origin of circumflex branch from right Valsava sinus (Figure 1). Ostium LCX was placed lower to the RCA (Figure 2,3) The vessel with retroaortic course reached coronary sulcus in its middle part and from there with typical curse (Figures 4,5). The vessel in middle part had uneven walls with calcification which marginally narrowing the lumen. Vessels were fulfilled with contrast medium weaker than the rest of coronary arteries.

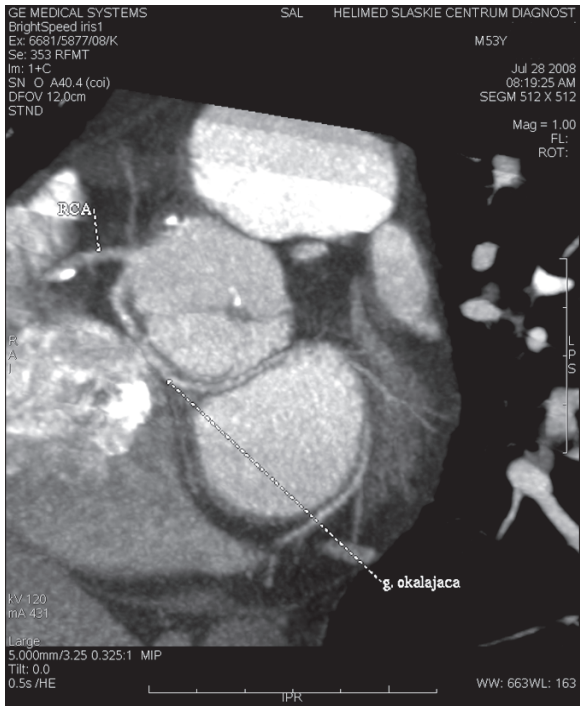

Figure 3. MIP image. Anomalous course of left circumflex branch. RCA – right coronary artery.

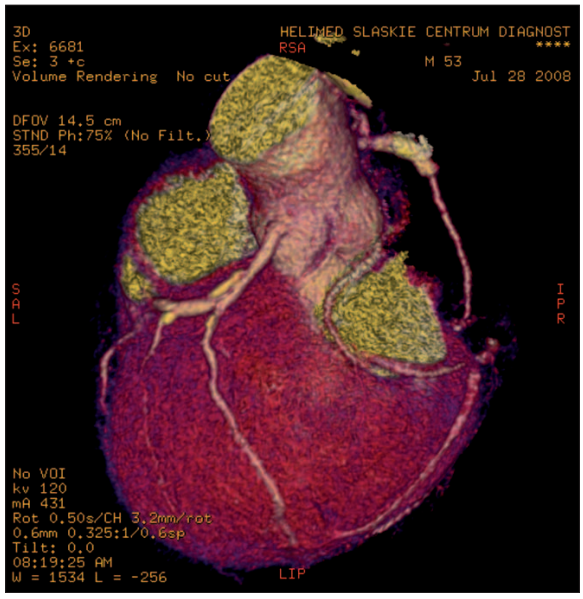

Figure 4. Volume rendering image. Retroaortic course of circumflex branche, anteriorly to left atrium. Left atrium is extracted from image. Calcification seen in left anterior descending artery.

Discussion

The percutaneus coronarography is a method of choice in evaluation of coronary arteries. The undisputed advantage of this method is its temporal resolution and possibility of therapeutic intervension during diagnostic procedure. On the other hand this method is limited to visualization only the inside of the vessels, without possibility of evaluation of wall and its surrounding. Selective percutaneus coronary

Figure 5. Curved reconstruction image. Left circumflex branch seen from ostium to distal part. LP – left atrium, PP – right atrium, LK – left ventricle.

angiography is challenging in case of coronary anomalies, there are only few indirect symptoms of anomalies. During the routine coronarography the frequency of diagnose of separate origin of LCX is low – about 0,67% of all procedures [9]. Misdiagnosed coronary vessels aberration during the coronarography procedure runs the risk of complications especially among the patients who are qualified to operation.

According to standards of American Radiology Society suspicion of presence of coronary arteries anomalies is indication to conduct angiography (heart CT or heart MR) [10]. The advantage of computed tomography over classic coronarography is visibility of all patent coronary vessels after single administration of contrast medium. It is possible to describe its anatomic relations, evaluation of walls and its changes. The computed tomography also gives the information connected with vessels correlation and precisely evaluates vessels walls. Thanks to the computed tomography three-dimension visualization is clearer before potential operation.

References:

1. Angelini P et al: Coronary Artery Anomalies: An Entity in Search of an Identity. Circulation, 2007; 115: 1296–305
2. Taylor AJ et al: Sudden cardiac death associated with isolated congenital coronary artery anomalies. J Am Coll Cardiol, 1992; 20: 640–47
3. Maron BJ et al: Sudden death in young competitive athletes: clinical, demographic, and pathological profiles. JAMA, 1996; 276: 199–204
4. Taylor AJ et al: Anomalous right or left coronary artery from the contralateral coronary sinus: "high-risk" abnormalities in the initial coronary artery course and heterogeneous clinical outcomes. Am Heart J, 1997; 133: 428–35
5. Basso C et al: Clinical profile of congenital coronary artery anomalies with origin from the wrong aortic sinus leading to sudden death in young competitive athletes. J Am Coll Cardiol, 2000; 35: 1493–501
6. Wójcik J et al: Zabiegi interwencyjne na ektopowo odchodzących tętnicach wieńcowych – opis 6 przypadków. Folia Cardiol, 2003, 10(6): 829–35
7. Wilkins CE et al: Coronary artery anomalies: A review of more than 10,000 patients from the Clayton Cardiovascular Laboratories. Tex Heart Inst J, 1988; 15: 166–73
8. Angelini P et al: Coronary Artery Anomalies – Current Clinical Issues Definitions, Classification, Incidence, Clinical Relevance, and Treatment Guidelines. Coronary artery anomalies: a comprehensive aproach. Philadelphia: Lippincott Williams&Wilkins, 1999; 42
9. Page HL et al: Anomalous origin of the left circumflex coronary artery. Recognition, angiographic demonstration and clinical significance. Circulation, 1974; 50: 768–73
10. Hendel et al: Appropriateness Criteria for CCT/CMR. JACC, 2006; 48(7): 1475–97