

A rare cause of variant angina: Single coronary artery arising from right sinus Valsalva

Mehmet O.O.^{1*}, Ouz K.¹, Mahmut Y.², Ekrem G.¹, Mustafa T., Ramazan K.²

¹Medipol University Faculty of Medicine, Cardiology Department, Istanbul, Turkey

²Kartal Kosuyolu Yuksek Ihtisas Ed. & Research Hospital, Cardiology Department, Istanbul, Turkey

Autors:

Mehmet Onur Omaygenc, MD, MedipolUniversityFaculty of Medicine, Cardiology Department, Istanbul, TURKEY

Oguz Karaca, MD, MedipolUniversityFaculty of Medicine, Cardiology Department, Istanbul, TURKEY

Mahmut Yesin, MD, Kartal KosuyoluYuksekihtisas Ed. and Research Hospital, Cardiology Department, Istanbul, TURKEY

Ekrem Guler, MD, MedipolUniversityFaculty of Medicine, Cardiology Department, Istanbul, TURKEY

Mustafa Tabakci, MD, Kartal KosuyoluYuksekihtisas Ed. and ResearchHospital, Cardiology Department, Istanbul, TURKEY

Ramazan Kargin, MD, Kartal Kosuyolu YuksekIhtisas Ed. and ResearchHospital, Cardiology Department, Istanbul, TURKEY

Abstract

Anomalous origin of a coronary artery from opposite sinus Valsalva is considerably rare. Although intertruncal course, acute take-off angle and co-existing atherosclerosis are major causes of ischemic events in this population, vasospastic angina should also be appreciated. Documenting transient ST segment elevations on ECG and excluding other possible reasons with conventional and CT coronary angiograms may result in this diagnosis. To the best of our knowledge this is the first case in the literature reporting Prinzmetal's phenomenon of a single coronary artery arising from right sinus Valsalva.

Keywords

variant angina, single coronary artery, coronary anomalie

Introduction

Anomalous origin of a coronary artery from the opposite sinus Valsalva is considerably rare¹. Although life-long asymptomatic state is quite possible, especially in patients with single coronary artery- first clinical presentation might be even sudden cardiac death. Estimating the risk of sudden death and eliminating the potential factors of myocardial ischemia are key points of the management algorithm in this group²⁻⁴.

Case report

A 36-year-old woman admitted to our hospital with typical rest angina that had lasted for an hour. She was a current smoker with a family history for coronary artery disease. Initial electrocardiography showed ST segment elevations on leads D1 and aVL along with reciprocal changes on leads D3 and aVF (Figure 1A). Transthoracic echocardiography revealed preserved left ventricular systolic function with mild hypokinesia in posterolateral wall. The patient was referred for coronary angiography following administration of antiplatelet agents and sublingual nitroglycerin. There was a complete relief of pain with normalization of the electrocardiography (Figure 1B) as soon as she had been transferred to cath-lab. The procedure

was started with left Judkins catheter but cannulation of the left main ostium could not be succeeded. Non-selective opaque injection revealed that the left sinus Valsalva was free of any coronary ostia. A right-Judkins catheter was successfully used to visualize right coronary, left anterior descending and circumflex arteries originating from the right sinus Valsalva with individual ostia (Figure 1C). No significant stenosis was detected. However acute angulation in proximal portion of circumflex artery was noteworthy. The patient was diagnosed as having variant angina since the pain and the ST segment elevations were completely resolved after nitroglycerin administration.

A coronary CT angiography was performed in third day to confirm the type of anomaly and to demonstrate the course of left coronary system (Figure 1D). Left anterior descending artery was passing anterior to right ventricular outflow tract and circumflex artery had a retro-aortic course. According to modified Lipton's classification this was a Type RIII-C anomaly and stated to have a benign nature and favorable prognosis^{1,5}. A pharmacological stress test could not be performed in elective conditions due to patient's unwillingness for the second procedure. She was treated with long-acting diltiazem and isosorbide mononitrate combination and had not experienced an

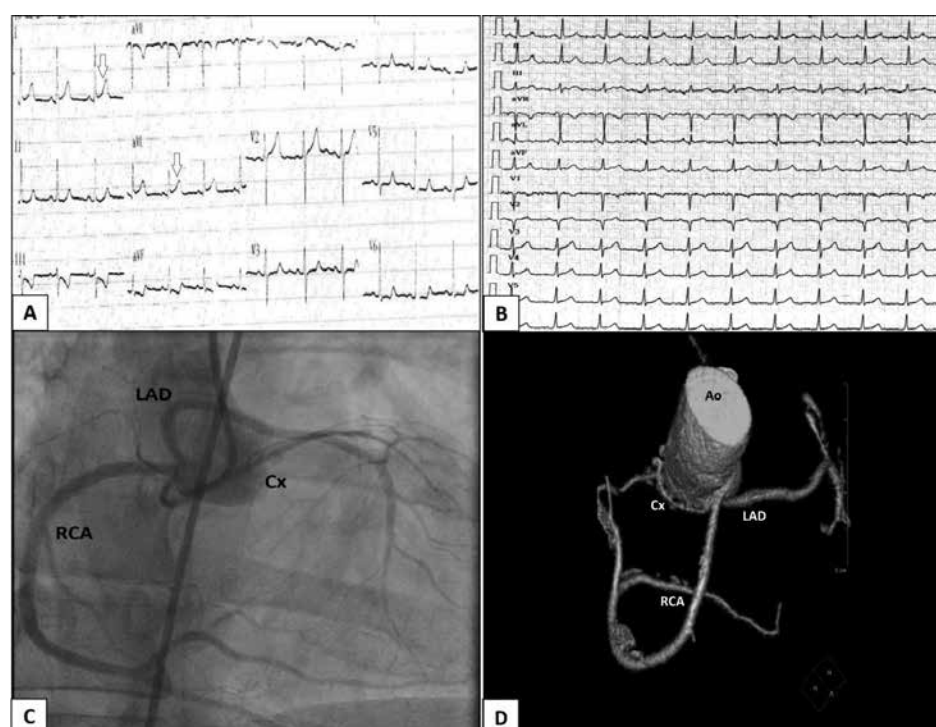


Figure 1: Initial 12-lead ECG of the patient during typical chest pain. Note the ST segment elevations on D1 and aVL (arrows), along with reciprocal changes in D3 and aVF (A). After administration of nitroglycerin, 12-lead ECG demonstrating normalization of the ST segment changes (B). Angiographic view of the whole coronary system originating from the right sinus Valsalva. Note that LAD, Cx and RCA have individual ostia (C). Reconstruction image of CT angiography demonstrating the anomalous origin of the left coronary system and its relationship with aorta. Cx artery passes posterior to the aorta and LAD traverses anterior to RVOT (D). Ao, aorta. Cx, circumflex artery. LAD, left anterior descending artery. RCA, right coronary artery. RVOT, right ventricular outflow tract.

angina episode during in-hospital follow-up thereafter. She was still symptom-free in sixth month visit.

Discussion

Origin of left coronary arteries from right sinus was reported with an incidence of 0.017 at angiographic series which is extremely rare¹. Well-known association of this situation with ischemia is due to possible intertruncal course of left main coronary artery or one of its main branches. Other possible routes for anomalous coronary artery can be specified as retro-aortic, pre-pulmonary and septal. Slit-like orifice, intramural course and finally acute take-off angle of relevant coronary artery also stand accused of adverse outcome^{4, 6}. Classically, significant atherosclerosis may exist in an anomalous coronary artery. Complex percutaneous intervention had been successfully performed in various cases so far^{7,8}. Aside from anatomical complications and atherosclerotic process, vasospastic events had also been reported to cause acute myocardial ischemia in the literature^{6,9}.

Multi-slice CT angiography recently became an invariable diagnostic step in the management algorithm of coronary anomalies not only by demonstrating anatomical relationships but also clearly visualizing luminal patency and some specifications like take-off angle. Just as in our case, it may provide substantial prognostic information^{2,4}.

Conclusion

Regarding to the fact that, significant luminal stenosis and external mechanical compression had been excluded with conventional and CT coronary angiography, the clinical scenario was attributed to coronary vasospasm in this case. To the best of our knowledge, this is the first case in the literature reporting Prinzmetal's angina with documented electrocardiographic changes in a patient with Type RIII single coronary artery.

Acknowledgements

The authors wanted to thank Prof. Ali Metin Esen as chief consultant for the management of the patient during in-hospital follow-up.

Conflict of interest: None declared.

References

1. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cath Cardiovasc Diagn.* 1990;21:28-40.
2. Aldana-Sepulveda N, Restrepo CS, Kimura-Hayama E. Single coronary artery: spectrum of imaging findings with multidetector CT. *J Cardiovasc Comput Tomogr.* 2013 Nov-Dec;7(6):391-9.
3. Hoffman JI. Abnormal origins of the coronary arteries from the aortic root. *Cardiol Young.* 2014 Oct;24(5):774-91.
4. Krupiński M, Urbańczyk-Zawadzka M, Laskowicz B, Irzyk M, Banyś R, Klimeczek P *et al.* Anomalous origin of the coronary artery from the wrong coronary sinus evaluated with computed tomography: "high-risk" anatomy and its clinical relevance. *Eur Radiol.* 2014 Oct;24(10):2353-9.
5. Lipton MJ, Barry WH, Obrez I, Silverman JF, Wexler L. Isolated single coronary artery: diagnosis, angiographic classification, and clinical significance. *Radiology* 1979; 130: 39-47.
6. Okuyan E, Dinckal MH. Left main coronary artery arising from right sinus of Valsalva: a rare congenital anomaly associated with distal vasospasm. *Kardiol Pol.* 2011;69(5):505-6.
7. Jorge C, Duarte JA, Cardoso P, Almeida AG, da Silva PC, Diogo AN. Acute myocardial infarction in patients with a very rare form of anomalous origin of the left main coronary artery. *Rev Esp Cardiol (Engl Ed).* 2013 Sep;66(9):744-6.
8. Akdeniz B, Gölddeli O, Güneri S, Baris N. Percutaneous coronary intervention in a patient with a single right coronary artery: A case report and review of the literature. *Int J Angiol.* 2007 Summer;16(2):66-8.
9. Utsunomiya D, Nakao K, Yamashita Y. Single coronary artery with spasm. *Radiat Med.* 2008 Jun;26(5):309-12.