Rawal Medical Journal

An official publication of Pakistan Medical Association Rawalpindi Islamabad branch

Established 1975

Volume 36 **Number 2** **March- June** **2011**

Case Report

Reimplantation of anomolous origin of the right coronory artery from the left coronary Sinus

Mohammad Alfayez, Zeyad Alshawabkah, Razi Abu Anzeh

Department of cardiac surgery, Queen Alia Heart Insitute, King Hussein Medical Centre, Amman, Jordan

ABSTRACT

Anomalous origin of the right coronary artery from the left aortic sinus is a frequent cause of sudden death in the young patients. We present a case of a young adult in whom the right coronary artery was reimplanted directly onto the aorta, rather than bypass as is typically done. (Rawal Med J 2011;36:161-164).

Keywords

Anomalous origin of right coronary artery, reimplantation.

INTRODUCTION

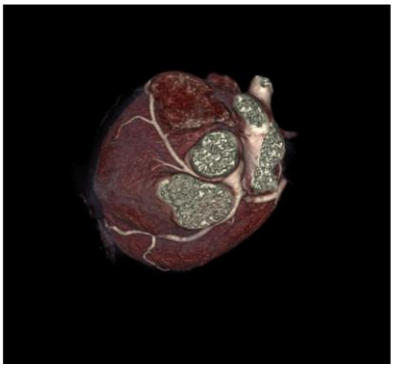
Coronary artery anomalies are observed in 0.3-1.3% of patients undergoing diagnostic coronary angiogram, in approximately 1% of routine autopsy examinations and in 4-15% of young patients who experience sudden death.[1-3] Of these anomalies, 90% are related to the origin of the coronary arteries, while remaining are coronary artery fistulae and two third are circumflex artery arising from the right sinus and crossing behind the aorta or the anterior descending artery and circumflex arising separately from the left sinus of vasalva.[3] Other one third are anomalous origin of right coronary artery (RCA) of the ascending aorta, whereas the left coronary artery (LCA) arises from the left posterior aortic sinus of the ascending aorta.[4] Ostia of the coronary arteries are located in the center of the corresponding aortic sinuses; in some cases the coronary ostia are slit like, so that during exercise the coronary artery gets compressed between aorta and

the pulmonary artery with consequent myocardial ischemia and sudden death.[5] The purpose of this report is to illustrate the importance of recognizing this anomaly and its surgical treatment.

CASE PRESENTATION

A 23 year old male, non diabetic and not hypertensive, but smoker, with positive family history of ischemic heart disease, presented with left sided chest pain on exertion of one year duration, increasing progressively over the last three months. Physical examination was unremarkable. An ECG showed normal sinus rhythm with no ischemic changes, CXR was normal and 2D-Echocardiogram showed normal left ventricle.

Fig 1. CT angiogram showing RCA originating from left coronary sinus, squeezed between aorta and pulmonary artery.

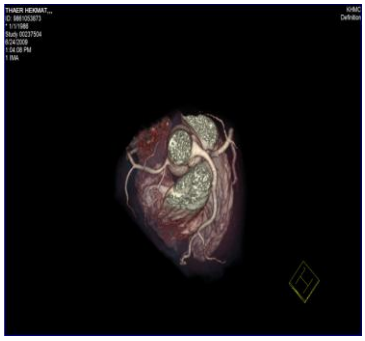


A CT angiogram showed that RCA originated from the posterior aortic sinus alongside with left main and passed between aortic and pulmonary artery; appeared squeezed between them (Fig 1). Coronary angiography revealed normal coronaries, but RCA originated from the left coronary sinus. He underwent reimplantation of RCA in the right sinus of valsalva. Postoperative coursewas smooth with no more chest pain. CT angiogram postoperatively showed normal coronaries regarding origin and course (Fig 2). Patient was followed in the clinic up to one year with no chest pain and showed normal ECG and normal left ventricle.

DISCUSSION

Anomalous RCA from the left sinus of valsalva is a rare congenital anomaly and represents the 2nd most frequent cause of athletic field deaths in USA.[4] Its prevalence is 0.01-0.026%.[2,6,7] It is often associated with bicuspid aortic valve, mitral valve prolapse, VSD and congenital heart disease.[5,7] This anomalous origin can lead to angina pectoris, myocardial infarction, syncopy or sudden death in the absence of atherosclerosis, or it may be asymptomatic.

Figs 2. Postoperative CT angiogram showing normal coronaries in both origin and course.



The causes of myocardial ischemia is not clear, but proposed causes include: ostial obstruction due to slit like coronary orifice,[2,4,6,8,9] compression of RCA between aorta and pulmonary artery,[4,6,8] stretching of RCA with aortic and pulmonary artery distention,[8] and coronory angulation with aortic and pulmonary artery.[2,4,6,8,9] In contrast to atherosclerotic coronary artery disease, the nature of these obstructions is dynamic and thus symptoms often occur only at maximal exertion.[8] Because of the eccentric compression between the two large vessels which show relative normal images on the LAD projection views, this anomaly can be missed during conventional angiogram.[9] MRI or multislice CT can delineate the anatomy and have recently replaced the angiography as definitive diagnostic tool.[3,4]

Treatment is targeted at those with increased risk of sudden death. These include patients whose anomalous artery is dominant,[4] those who have a proximal intramural course of the anomalous vessel,[4] and those who present with symptoms before 35 years old age.[4,5,10] In older patients, the aim is good symptomatic relief because the risk of sudden death decreases with age. The procedures used include bypass procedures designed to establish normal coronary anatomy like reimplantation of the anomalous right coronary artery, unroofing procedures. Competitive flow phenomena can be mitigated by ligation of RCA proximal to the bypass graft,[11] but this may render patients graft-dependent and prone to infarction if graft fails.

Reimplantation of RCA ostium provides a good physiological and anatomical repair.[4] However, care needs be taken to ensure that the new ostium has no kinks or angulations and adequate mobilization and length of the distal anastamosis site is critical.[6,8] In conclusion, anomalous origin of RCA is rare but potentially life threatening and treatable course for myocardial infarction and sudden cardiac arrest. Correct surgical repair depends on precise determination of the anatomy and mechanisms of ischemia, which is seen after reimplantation procedure.

Correspondence: Dr.Zeyad Alshawabkah, E.mail: zeyadshawabkah@yahoo.com

Received: August 27, 2010 Accepted: February 2, 2011

REFERENCES

1. Shirani J, Brofferro A. Isolated coronary artery anomalies:e.medicine on line; updated [Dec 8,2009].available from e medicine.medscape.com.
2. Ho JS, Strickman NE. Anomalous origin of the right coronary artery from the left coronary sinus. Tex Heart Inst J 2002;29:37-39.
3. Karimi M, Murdison K, Wood WB, Davis W. Reimplantation of anomalous right coronary artery from left coronary artery:a surgical option. Interact Cardio Vasc Thorac Surg 2010;10:642-4.
4. Hamzeh G, Crespo A, Estaran R, Rodriguez MA, Voces R, Arameni JI. Anomolous origin of right coronary artery from left coronary sinus. Asian Cardiovasc Thorac Ann 2008;16:305-8.
5. Limar V, Pamidi N, Rakesh V, Vollala VR, Kumar S, Jetti R. Origin of right coronary artery from the left sinus of valsalva. Internat J Anat Variations 20081:12-13.
6. Rogers Jr SO, Leacche M, Mihaljevic T, Rawan JD, Byrne JG. Surgery for anomalous origin of the right coronary artery from the left aortic sinus. Ann Thorac Surg 2004:78:1829-31.
7. Markou V, Gavrielatos G. Anomolous origin of right coronary artery: is there a link between coronary artery and myocardial ischemia. Internet J Cardiol 2007;5.updated 2009 Feb 13. available from www.ispub.com/ostia/index.php?xml file path=journal/ijc/volsni/rca.xml.
8. Motamen HT, Bannister SP, Corcoran PC, Stewart RW, Mulligan CR, Devries WC. Repair of anomalous origin of right coronary artery from the left sinus of valsalva. Ann Thorac Surg 2008;85:2135-36.
9. Moon JV, Jeong HC, Cho JY. Anomolous origin of a right coronary artery with extrinsic compression between the great vessels. Korean Circ J 2008;38:390-92.
10. Turkmen N, Eren B, Fedakar R, Durak D. Sudden death related to anomalous origin of coronary artery and coexisting fenestrated membrane of the sinus coronaries. Singapore Med J 2007;48:576-8.
11. Reul R, Cooley D, Hallman G. Surgical treatment of coronary artery anomalies:report of a 37 ½ -year experience at the Texas Heart Institute J 2002;29:299-307.