Case Study

Double Right Coronary Artery with Dual Atherosclerotic Lesions – A Rare Anomaly presenting with Angina

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Abstract
Double right coronary artery (RCA) is a rare congenital coronary anomaly with previous many case reports in literature. There are no case reports of double right coronary artery anomaly presenting with effort angina. In this case report a 72-year-old man presented with angina chest pain of CCS class II of 6 months duration. He was a known hypertensive on antihypertensive medications. ECG showed non specific T wave inversions in II, III, aVF. Coronary angiogram done revealed double right coronary artery with separate ostia arising from right coronary sinus. Both the RCA had atherosclerotic plaques causing significant stenosis of RCA.

Keywords: Double right coronary artery, congenital coronary anomaly, atherosclerosis

Introduction
Coronary artery anomalies are defined as those angiographic findings in which the number, origin, course, and termination of these arteries are rarely encountered in the general population. The prevalence of congenital anomalies of the coronary arteries (CAAs) is reported to be approximately 0.2–1.4% of the general population. Dual RCA or double RCA is one the rarest coronary anomalies reported in literature with its incidence varying in different series. Here we are reporting a case of double right coronary artery who presented with effort angina.
**Case report**

A 72-year-old man presented with angina chest pain of CCS class II of 6 months duration. He was a known hypertensive on antihypertensive medications. ECG showed non specific T wave inversions in precordial leads. Echocardiography revealed structurally normal heart with a normal LV function. When coronary angiography was performed later to evaluate his coronary anatomy, an interesting finding was found to be present in the right circulation. Injecting contrast dye into the right coronary artery resulted in selective opacification of 2 different Right Coronary Arteries (RCA) arising from a separate right coronary sinus and coursing down towards the right atrio-ventricular groove. There were two different right coronary arteries originating from the right sinus of Valsalva with the different ostia (Image 1 and 2). In addition, both of them had atherosclerotic plaques.

The superior RCA, had a single atherosclerotic lesion of around 80%. The second, more inferior RCA had two atherosclerotic plaques of 80% proximally and 95% distally. Left coronary artery system was normal except for insignificant distal LAD lesion.
Discussion

Double RCA is a very rare coronary anomaly. The correct definition of double coronary artery has been a matter of controversy. Different author's have used different terminologies for the definition of double right coronary artery like dual RCA, split RCA, duplicated RCA and other terminologies

a) Nair et al. (2005)\(^2\) suggested in conventional coronary angiography that both RCA vessels run parallel in the right atrioventricular groove and both cross the crux.

b) Kunimasa et al. (2007)\(^3\) Sato et al. (2008)\(^4\)— proposed that double RCA should be defined when both supply the blood to the inferior left ventricular myocardium; thus, both RCAs should course downwardly to reach the interventricular sulcus whether or not they cross the crux.

c) Lemburg et al. (2007)\(^5\)— suggested that adjacent but separate ostia of two RCA vessels with almost similar diameters indicate the presence of true double RCA.

d) Misuraca et al. (2010)\(^6\)— described a right coronary system formed of two distinct branches running very closely together in the atrioventricular groove. The two branches, are of a similar caliber and can originate from a single proximal trunk or arise from distinct orifices in the right sinus of Valsalva.

In the coronary angiography cohort of Yamanaka and colleagues\(^7\) with 1,26,595 patients, which is among the most populous coronary angiography series, the incidence of congenital coronary anomalies was 1.6%, however, no double RCA anomaly was reported in this patient cohort. In a wide study of Harikrishnan and colleagues\(^8\) with 7400 patients, the incidence of congenital coronary anomaly was 0.46% and double RCA was detected only in one case (incidence: 0.01%). MDCT might be an alternative or adjunctive imaging modality to coronary angiography because it is a safe, non-invasive, cost-effective and fast imaging tool which offers detailed evaluation of coronary arteries. MDCT might also be useful to differentiate double RCA from high take off of a large right ventricular branch. There are only case reports of double RCA with no true incidence studies. Till now it has been reported 40 times in literature with 47 patients detected to have this coronary anomaly. Most of the cases are reported from Turkey. Previously double RCA was thought to be a benign lesion. Those with single ostium origin was considered to be more prone to atherosclerosis than those with double ostium. The spectrum of presentation of double RCA reported till date has been from incidental finding with normal double RCA in patients undergoing coronary angiogram for other reasons to insignificant plaques, to ACS-most of the reported cases either presented with acute inferior wall MI. Patients presenting with ACS had single ostium. There is no reported case of double RCA presenting with effort angina though unstable angina has been reported. Our patient presented with effort angina and was advised a trial of optimal medical management after which the angina decreased.
Conclusion
Double right coronary artery is a rare coronary anomaly. Though previously considered to be a benign anomaly it can have varied presentations like stable angina like in our patient to unstable angina or present with acute coronary syndrome as in various case reports in literature. It can also pose challenges to the cardiologist or cardiovascular surgeons during revascularization procedures

References