Case Report

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Anomalous Origin of Right Coronary Artery from Left Coronary Sinus

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Abstract

We present a case of 62 year old male presenting with effort dyspnea NYHA class II with evidence of inferior ischaemia in EKG. Being a nonharbor of conventional coronary risk factors and as the patient was unable to perform TMT in view of disabling osteoarthritis, we subjected the patient to conventional invasive coronary angiogram which revealed an empty right coronary sinus with anomalous origin from right coronary artery (RCA) from left coronary sinus with interarterial course (between aorta and pulmonary artery) delineated in 256 slice CT coronary angiogram. Being notorious to develop syncope, artherothrombosis, torsades de pointes and sudden cardiac death in its natural course, this anomaly presented with a more benign way in present case. A vigilant look should be there to left sinus when someone encounters an empty right sinus during routine coronary angiography and CT coronary angiogram must be taken to delineate its anatomic route that dictates its natural history.

Keywords: Coronary; Syncope; Interarterial.

Introduction

Among coronary artery anomalies, anomalous origin of coronary artery from opposite sinus (ACAOS) poses a relatively higher risk of sudden death, particularly in the young athletes [1] and when the anomalous artery courses between the ascending aorta and pulmonary trunk [2, 3] as in our case. Most of the ACAOS remain benign, but they may present with exertional angina, effort dyspnea, dizziness, palpitation, syncope and sudden cardiac death [4]. Right ACAOS is more common than left ACAOS (where the left main coronary artery arises from the right coronary cusp) and is generally considered more benign [4]. While it is agreed that surgical correction is the standard of care for left ACAOS, the management of right ACAOS is more difficult, debating and many times conservative. CT coronary angiography and cardiac MRI defines its high-risk features including the presence of a slit-like orifice, intramural segment within the aortic wall, intraseptal course and interarterial course between aorta and pulmonary artery [5]. Traditional cardiac surgery for ACAOS includes coronary bypass in those with obstructive CAD and corrective procedures in those without obstructive coronary artery disease including direct implantation of the anomalous artery to the destined sinus, unroofing the intramural segment of the vessel within the aortic wall, and osteoplasty for slit like ostium of ACAOS. Ours case is a rare (0.28%)coronary anomaly [6] presenting late in its course with symptoms secondary to systolic compression of anomalous RCA between aorta and pulmonary artery without any atherosclerotic plaque inside. Extrinsic compression of this type of coronary anomaly can also occur in patients with severe pulmonary hypertension, systemic hypertension with enlarged pulmonary and aortic trunk [7, 8].

Case

We present a 62 year old male, nondiabetic, nonhypertensive and nonsmoker presented with effort dyspnea NYHA class II with exertional angina CCS II with disabling osteoarthritis in need of total

knee replacement. Baseline EKG revealed downsloping ST-T changes in II, III and aVF, routine blood chemistry revealed mild dyslipidemia with LDL being 128mg/dl and rest of the parameters within normal limit. ECHO revealed no RWMA (regional wall motion abnormality) with normal LVEF and Grade I diastolic dysfunction. Patient was unable to perform TMT due to crippling arthritis. In view of symptomatic ischemia he was subjected to invasive coronary angiogram which revealed anomalous RCA arising from left sinus and right sinus injection rewarded to be empty with no obstructive plaque in coronaries. In order to ascertain the route of ischemia in aforesaid patient, we again subjected him to 256 slice CT coronary angiogram on 3rd day of routine angiogram to prevent contrast induced kidney damage with heart rate modulation with beta blocker. CT angiogram revealed the origin of anomalous RCA from left coronary sinus slightly higher and anterior to the origin of left coronary artery and traversing between aorta and pulmonary artery whose systolic compression was giving rise to limiting angina in this patient. We advised the patient to abstain from strenuous activity, advocated optimum beta blocker therapy with statin and baby aspirin towards primary prevention. A brief interaction with our cardiac surgeon ended in a short conclusion to go for RCA implantation to right coronary sinus if patient remains symptomatic in follow up, although it may be a strenuous and tortuous job for him to reroute the coronary to the native ostium again.

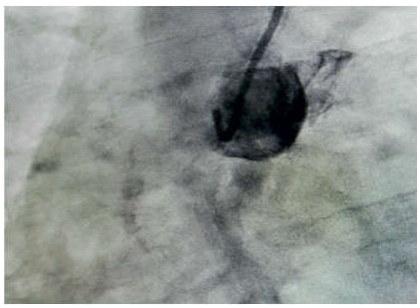

Fig. 1: Empty right sinus injection

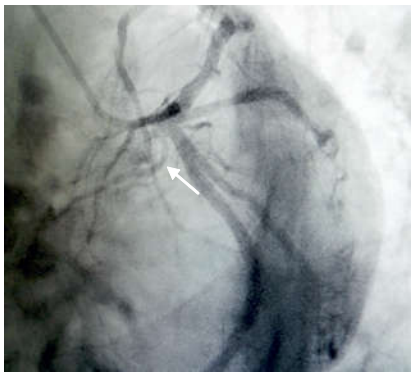

Fig. 2: RCA arising from left sinus

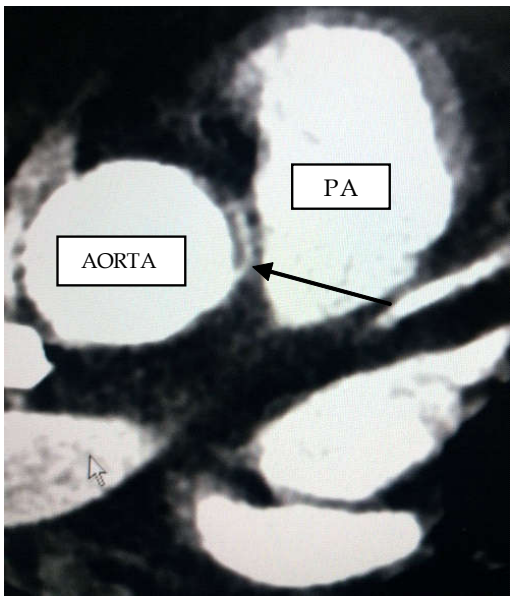

Fig. 3: RCA between aorta and Pulmonary artery in CT angiogram

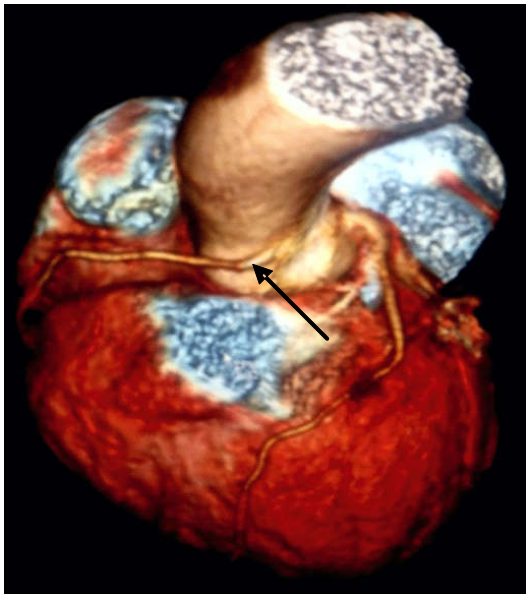

Fig. 4: Anomalous RCA arising from high anterior left coronary sinus

Discussion

Anomalous coronary artery incidence in general population is more than 1% according to the great philosopher behind these anomalies; Paul Angelini [9]. The most devastating catastrophe they result in, is sudden cardiac death [10]. Run of torsades has been reported with those anomalous arteries. Congenital association with bicuspid aortic valve and MVP [11] besides ASD, VSD PDA is rarely observed with those anomalies. Out of all coronary anomalies ACAOS represent a specific subset those are prone to systolic compression between aorta and pulmonary artery which is commonest type of

compression [12] besides intramural compression inside aortic root and intraseptal one. Sometimes a slit like orifice of this anomalous artery hinders blood flow resulting in rest ischemia and angina. Tortuous courses of ACAOS become nidus for development of artherothrombosis as increased shear stress in tortousity leads to endothelial denudation and development of atherosclerotic plaque [13]. Although difficult to cannulate those coronaries with conventional catheters, successful PTCA with stenting has been reported in literature in paucity [14]. Our case is an unique example of obligate coronary ischemia due to systolic compression of anomalous RCA although it was disease free. Proceeding to a late stage treadmill in our case may lead to run of ischemic VT, torsades and may lead to catastrophe. Although ACAOS present commonly in young, our case is a delayed presentation of ACAOS; may be unfolding and dilation of aorta at this elderly age compressing the anomalous RCA between aorta and pulmonary artery which was not evident early in young age due to a normal caliber aorta. We thought to protect the patient from ischemia due to systolic compression with adequate beta blockade. Although coronary artery disease was not evident in our case, we put the patient on aspirin and statin for primary prevention. Implantation of anomalous right coronary to right sinus was planned after a fair try of beta blocker and activity restriction although it may be a difficult job. Due to non obstructive nature of coronaries, CABG was not considered although it is the best option for diseased coronaries. One important lesion we learn from the angiogram of this patient is when one observes an empty right sinus; one should have a close look to the left sinus for anomalous RCA.

Conclusion

We represent a rare case of anomalous right coronary artery arising from the left sinus with atypical presentation in elderly age. 256 slice coronary CT angiogram was only able to bring out its furiousity by demonstrating its interarterial course between aorta and pulmonary artery resulting in obligate coronary ischemia. Early recognition of those rare anomalies can save a young from sudden cardiac death. *Small suspicion sometimes save*: let us learn.

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