Case 14073

Two rare cases of absent coronary arteries (LCX and RCA)
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Section: Cardiovascular
Area of Interest: Cardiovascular system
Procedure: Computer Applications-3D
Procedure: Computer Applications-Detection, diagnosis
Imaging Technique: CT-Angiography
Special Focus: Congenital Case Type: Clinical Cases
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Patient: 57 years, male
Clinical History:

Case A: 57-year-old male patient presented with atypical chest pain. CT coronary angiography was performed to rule out significant coronary artery stenosis.

Case B: 67-year-old male patient with chest pain and exertional dyspnoea. Positive treadmill test. Previous history of similar episodes.

Imaging Findings:

Case A: Calcium score of 150 with predominant calcifications along the LAD. Complete absence of the left circumflex artery (LCX) with no vessel visualised in the superior aspect of the left atrio-ventricular groove. The RCA was superdominant giving rise to the PDA and PLV branches along with extension along the base of the heart to the inferior aspect of the left atrio-ventricular groove supplying the lateral wall of the left ventricle. Multilevel mixed plaques noted along the LAD without significant stenosis.

Case B: Negligible calcium score. Complete absence of the right coronary artery (RCA) in the right atrio-ventricular groove. The LAD demonstrated bridging. The LCX was superdominant in this case giving origin to the PDA and PLV. It also supplied the base of the heart and extended into the right atrio-ventricular groove supplying the right side of the heart. Features of hypertrophic cardiomyopathy were also demonstrated.

Discussion:

CT coronary angiography is of great value in the depiction of congenital coronary artery anomalies with multiple studies showing 100% accuracy in evaluation of these anomalies [1, 2]

Absence of the left circumflex artery (Case A) is an extremely rare anomaly with an incidence of only 0.003% in patients undergoing coronary angiography [3]. This condition is nearly always accompanied by a superdominant right coronary artery with its distal branches coursing into the left atrioventricular groove along the course of the normal left circumflex artery and supplying the left ventricle as demonstrated in our case. Another group of authors prefer to classify this condition as an anomalous origin of the LCX from distal RCA [4]. However, in our opinion, this is a more confusing approach to classification. The majority of the cases have a benign course. Exertional chest pain is one symptom that has been reported in the literature as associated with this condition. This may be due to transient ischemia of the left ventricular inferior and septal walls during exertion supplied by the right coronary artery
which may be insufficient to meet the physical demands [5].

Case B is an example of a “Single Coronary Artery Anomaly”. Isolated single coronary artery is extremely rare, with an incidence of 0.024% to 0.066% in the general population [6]. The presently used classification system was proposed by Lipton et al [7]. According to this classification, two main types are noted called the ‘R’ right-type and ‘L’ left-type according to the site of origin of the single coronary artery in the right or left sinus of Valsalva. Each case is further subdivided into groups I, II or III depending on the anatomical course of the artery [8]. Our case is the L-I subtype which originates from the left sinus of Valsalva with a superdominant LCX continuing into the right atrioventricular groove without a malignant course. The prognosis for single coronary artery is variable and is highly dependent on the course of the artery. Subgroups II and III have more malignant and interarterial courses and are thus associated with sudden death [9]. The rest of the subtypes are managed symptomatically.

Case A was managed conservatively as the cardiac CT showed no significant stenosis. A cardiac MRI with perfusion and delayed enhancement was recommended for Case B to ascertain any functional significance of the hypertrophic cardiomyopathy and the coronary anomaly. In both cases, depiction of the absent coronary arteries is vital for any future coronary interventions.

Differential Diagnosis List: Case A: Absent left circumflex arteryCase B: Absent right coronary artery, Acquired occlusion of the coronary artery, Congenital atresia of the coronary artery ostium

Final Diagnosis: Case A: Absent left circumflex arteryCase B: Absent right coronary artery

References:

Figure 1

a

Description: Volume rendered image shows a superdominant RCA in the base of the heart with an absent LCX. Origin: Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE

b

Description: Volume rendered image shows the RCA extending into the left atrio-ventricular groove. Origin: Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE
**Description:** Axial image shows normal location of the RCA and the LAD with an absent LCX in the left atrio-ventricular groove. **Origin:** Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE
Description: Axial MIP image at the base of the heart shows branches of the RCA supplying the lateral wall of the left ventricle. Origin: Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE
Description: Volume rendered image shows complete absence of the RCA at the level of the right coronary ostium. Origin: Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE
Description: Volume rendered image shows an absent RCA with a large LCX extending into the right atrio-ventricular groove. Origin: Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE.
**Description:** Axial CT image shows absent RCA in the right atrio-ventricular groove with normal position of the LAD and LCX. **Origin:** Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE
Description: Coronal MIP image shows the large LCX extending across the base of the heart to supply the right side. Origin: Department of Radiology, Al Noor Hospital, Airport Road, Abu Dhabi, UAE