Clinical vignette

A man with four coronary arteries

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A 52-year-old Caucasian male presented with shortness of breath and exertional fatigue. A persatine cardiololyte stress test showed a large inferolateral wall reversible defect. Coronary angiography showed four coronary arteries, each arising from a separate ostium. The right coronary artery (RCA) and left circumflex (LCx) artery originated from the two separate ostia in the right coronary sinus (Panels A, C, and D). The left anterior descending (LAD) and ramus intermedius (RI) arteries originated from two separate ostia in the left coronary sinus (Panels B and D). The RCA had proximal chronic total occlusion, and the LCx artery had 60% intermediate stenosis in the proximal segment. The LCx had a posterior course (Panel D). There was 80% focal stenosis of the first diagonal branch of LAD and 70% focal stenosis of the RI in the proximal segment.

There are two hypotheses regarding development of epicardial arteries. First, there are two endothelial buds arising from the truncus arteriosus, which give rise to two coronary arteries. Secondly, there are six endothelial buds arising from each sinus of the truncus arteriosus, of which four involutes and coronary arteries arise from the remaining two. The presence of four coronary arteries from two coronary sinuses can be explained by the abnormal septation of two endothelial buds or the involution of two from six endothelial buds.

Not much is known about the risk entailed when early atherosclerosis is found in such abnormal coronary arteries. With the advent of imaging modalities such as CT angiogram, accurate diagnosis especially of the origin and course of the coronary arteries is possible. This is important in diagnosing potentially high-risk anomalies and involvement of atherosclerotic process.

Panel A. Left anterior oblique projection showing separate origin of RCA and LCx arteries from the right coronary sinus. RCA is totally occluded in the proximal segment.
Panel B. Antero-posterior caudal projection showing separate origin of LAD artery and RI artery from the left coronary cusp.
Panel C. Left anterior oblique projection showing separate origin of RCA and LCx artery from the right coronary sinus. RCA has a stent.
Panel D. Multiplanar reconstruction of coronary CT angiogram (global view) demonstrating four separate coronary ostia. Anomalous origin of LCx and RCA from the right coronary sinus and their course are evident. RCA has a stent. Separate origin of the LAD and RI arteries from the left coronary sinus is also noticeable.