Single coronary artery from the right sinus of valsalva: an unusual variant of a rare condition

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An 83-year-old woman presenting with collapse was found to have an impaired left ventricular ejection fraction (20% predicted). Conventional coronary angiography and magnetic resonance imaging (MRI) were both unable to define the coronary artery anatomy. MRI revealed no previous myocardial infarction or fibrosis. A computed tomographic (CT) coronary angiogram was performed, revealing a single coronary artery (SCA) arising from the right coronary sinus. This vessel quadrifurcated into (i) a normal dominant right coronary

Figure 1  Volume rendered and maximum intensity projection (MIP) images showing single coronary artery arising from the right coronary sinus. It quadrifurcates into a normally coursed dominant right coronary artery, an anomalous left anterior descending artery coursing anterior to the pulmonary artery and right ventricle, a cristal artery supplying the proximal LAD territory and giving rise to a significant diagonal branch, and a retro-aortic left circumflex artery. LAD, left anterior descending artery; D, diagonal branch; CA, cristal artery; LCX, left circumflex artery; OM, obtuse marginal branch; RCA, right coronary artery; RVOT, right ventricular outflow tract; PA, pulmonary artery.
artery supplying the posterior circulation, (ii) an anomalous left anterior descending (LAD) artery passing anterior to the pulmonary artery and right ventricle to supply the distal LAD territory, (iii) a cristal artery\textsuperscript{1} supplying the proximal LAD territory, becoming epicardial more distally and giving rise to a significant diagonal branch, and (iv) a retro-aortic left circumflex artery supplying the lateral territories (Figure 1). No flow limiting coronary artery stenosis or compression was seen. Despite the anatomical findings, there was no coronary narrowing to account for the impaired ventricular function.

SCA supply to the entire heart is rare,\textsuperscript{2–4} occurring in \(\sim 0.024\text{–}0.066\%\) of the population.\textsuperscript{3,4} The specific anomaly we report is previously undescribed. It is classified as R-III(c) subtype according to the modified Lipton’s classification\textsuperscript{2–4} and is characterized by the combination of an anomalous LAD and a cristal artery supplying the left anterior coronary territory together. This variant may be described as ‘benign’ in the absence of a major vessel between the aorta and pulmonary artery, the ‘malignant’ anatomy most associated with sudden cardiac death. The intra-septal coronary, which is an extension of the cristal artery, is an occasional variant not associated with sudden cardiac death, the vessel being less constrained.\textsuperscript{1} Reaching this mature age without ill effects also suggests a ‘benign’ physiology. Multi-slice CT is non-invasive and provides axial images with excellent resolution, which can be further manipulated to provide multi-planar and volumetric images ideal for delineation of complex variants of coronary anatomy and provide a unique spatial appreciation of relevant relationships of anomalous coronary arteries.\textsuperscript{3}.

References