All four coronary arteries arising separately from the right aortic sinus of Valsalva: rare anomaly

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Accepted 23 March 2019

DESCRIPTION

A 60-year-old man presented with a history of new-onset retrosternal chest pain radiating to both arms for the past 2 days. The resting ECG revealed ST coving with T inversion in the inferior leads. Cardiac enzymes were also elevated. Echocardiography showed near normal biventricular function; however, minimal hypokinesia of the inferior wall was noted. Diagnosis of non-ST

Figure 1 Right coronary artery angiogram.

Figure 2 Right aortic sinus injection demonstrating the separate origin of all four coronary arteries. LAD, left anterior descending; LCX, left circumflex; RI, ramus intermedius; RCA, right coronary artery.

Figure 3 Reconstructed CT coronary angiography showing origin of all four coronary arteries from the right aortic sinus of Valsalva. LAD, left anterior descending; LCX, left circumflex; RI, ramus intermedius; RCA, right coronary artery.

elevation myocardial infarction was made, and the patient was subjected to coronary angiography. The right radial route was selected for coronary angiography. We first cannulated the right coronary artery (RCA), which revealed plaques but no significant obstructive lesion (figure 1). After that, we tried to cannulate the ostium of left coronary artery in the left aortic sinus but failed despite multiple attempts. Then, we performed a non-selective aortic root angiogram, which faintly visualised the origin of a few other vessels near the ostium of RCA. We then kept the Judkin Right diagnostic catheter near the ostium of RCA and injected contrast which revealed anomalously arising left anterior descending (LAD), left circumflex (LCX) and ramus intermedius (RI) coronary arteries, all arising through separate

Figure 4 Reconstructed CT coronary angiography showing all four coronary arteries originating separately from the right aortic sinus of Valsalva. LAD, left anterior descending; LCX, left circumflex; RI, ramus intermedius; RCA, right coronary artery.

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To cite: Choudhary R, Batra A, Malik V, et al. *BMJ Case Rep* 2019;**12**:e229498. doi:10.1136/bcr-2019-229498

Figure 5 Figure showing all four coronary arteries arising separately from the right aortic sinus of Valsalva. LAD, left anterior descending; LCX, left circumflex; RI, ramus intermedius; RCA, right coronary artery.

Learning points

- ▶ The absence of left coronary artery origin from left coronary sinus should make suspicion of anomalous origin of left-sided coronary arteries.
- ▶ The origin of all four coronary arteries from four separate ostia is an exceedingly rare anomaly.
- ▶ Percutaneous coronary intervention is technically challenging in such cases because of altered ostial configuration and the route of the artery. Appropriate guide selection is mandatory in such cases.
- ▶ Angina may occur secondary to the atherosclerotic lesions or because of the compression of the artery while passing between the aorta and the pulmonary artery.

ostia from the right aortic sinus of Valsalva (figure 2). None of these arteries revealed any significant obstructive lesions. No coronary intervention was needed. The patient was managed conservatively with high-dose statins, antiplatelet drugs and other recommended therapy. CT coronary angiography was done which confirmed the separate anomalous origin of four coronaries from right sinus and delineated their courses (figures 3-5). LAD and RI followed an anterior course, while LCX was retroaortic in its course. None of the vessels passed between the aorta and the pulmonary artery.

The independent origin of all four coronary arteries (RCA, LAD, LCX and RI) from four separate ostia in the right aortic sinus of Valsalva is an exceptionally rare anomaly.¹ The course of LAD anterior to the right ventricle or behind the aorta has not been found to be associated with any adverse events.¹ On the contrary, the course of LAD passing between aorta and pulmonary artery has been associated with an increased risk of ischaemic events and sudden cardiac death.^{1,2} Recognition of such variations in coronary anatomy is essential since failure to angiographically identify the origin and course of the anomalous coronary arteries can result in inappropriate clinical decisions and complications during coronary angioplasty or cardiac surgery.

Contributors RC did the coronary angiogram and made the diagnosis. VM provided the CT images. KM and AB wrote the manuscript. All authors read and approved the final version of the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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