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References

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CARDIOVASCULAR FLASHLIGHT

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Cardiac hybrid imaging in a patient with a single coronary artery originating from the right sinus of Valsalva

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A 59-year-old female patient presented to the emergency department of the University Hospital of Zurich with an acute onset of severe chest pain during the last 2 h. After sublingual nitroglycerin administration, the chest pain largely resolved. The electrocardiogram showed no ischaemic ST-segment or T-wave changes. Laboratory examination revealed an elevated troponin T (0.019 µg/L).

The clinical presentation was suggestive of a non-ST elevation acute coronary syndrome and the patient underwent coronary angiography revealing a single coronary artery originating from the right sinus of Valsalva, a rare coronary anomaly, combined with coronary artery disease, with two subtotal stenoses of the dominant right coronary artery (RCA; *Figure 1A*). The left anterior descending (LAD) and circumflex (LCX) artery derived from a short left main equivalent and coursed aberrantly to the left side (*Figure 1A*). The LCX equivalent had a small lumen diameter in the whole proximal segment, where the artery showed an irregular contour, suggestive of a long atherosclerotic lesion (*Figure 1A*). Coronary stent implantation in the RCA was performed immediately due to severe angina pectoris symptoms in the cath lab (*Figure 1B*), after which the patient was free of angina. Afterwards, the patient was examined by cardiac hybrid imaging (combining coronary CT and ^{99m}Tc-tetrofosmin SPECT myocardial perfusion imaging; *Figures 1C–H*) to determine the course of the coronary arteries and potential related myocardial ischaemia. The LAD equivalent coursed anterior to the right ventricle and the LCX equivalent coursed prepulmonary (*Figures 1G and H*), indicating a particularly rare coronary anomaly. Cardiac hybrid imaging revealed a small myocardial ischaemia in the lateral territory supplied by the LCX equivalent (*Figure 1D*) that was treated medically using a β-blocker. In the follow-up, the patient was free of angina pectoris or dyspnoea.

Here, we describe to the best of our knowledge the first case of cardiac hybrid imaging evaluation in a patient with a single coronary artery. A diagnostic challenge in these patients is to determine whether cardiac ischaemia is related to coronary atherosclerotic lesions or to the congenital abnormality that may cause cardiac ischaemia by several mechanisms. In the present case, the extent of cardiac ischaemia was small and related to the territory supplied by the LCX equivalent, suggesting that it was not resulting from the course of the left main equivalent.

Surgical correction in patients with isolated coronary artery anomalies is in particular considered in patients who have coronary arteries coursing between the aorta and pulmonary artery, since this abnormality has been observed to be related to sudden cardiac death, typically but not exclusively at a young age (<30 years) and in patients where a large cardiac territory is at risk for ischaemia.

In summary, in our patient, coronary artery disease was present in the setting of a rare coronary congenital abnormality. Cardiac hybrid imaging suggested that cardiac ischaemia was not related to the course of the left main equivalent, since ischaemia was clearly limited to the territory supplied by the LCX equivalent, and was most likely due to a long atherosclerotic lesion observed in the proximal segment of this artery. Given that the patient was free of symptoms in the follow-up, had a small extent of ischaemia, and a preserved LV function, an optimal medical therapy rather than a further interventional or surgical treatment was recommended.

