CASE REPORT

Left main stem/LCA arising from right coronary sinus with an interarterial course

Mohammad Waleed,¹ Ali Raza,¹ Tariq Minhaj,² Timothy Houghton²

¹Department of Cardiology, Castle Hill Hospital, East Yorkshire, UK
²Department of Cardiology, Scarborough General Hospital, North Yorkshire, UK

Correspondence to
 Dr Mohammad Waleed,
 waleed1280@yahoo.com

Accepted 22 June 2014

SUMMARY

A 67-year-old woman presented to the accident and emergency department with central chest pain for the past 4 months. She described the pain as severe, retrosternal, intermittent, indigestion/burning type, with radiations to the left arm. She had used antacids with no relief. Her medical history included hypertension, chronic obstructive pulmonary disease, pulmonary fibrosis, left mastectomy for breast cancer, hypercholesterolaemia and osteoarthritis. Her medications included anastrozole, indapamide, perindopril, aspirin, clopidogrel, atorvastatin, salbutamol and atrovent inhalers. She was a non-smoker and vegetarian. Two brothers each had a myocardial infarction when in their early 40s.

BACKGROUND

The younger population can present with atypical chest pain or sudden cardiac death due to anomalous origin of the coronary artery. Clinicians should be aware of such angiographic findings, and this must be taken into consideration especially in young age group patients without any ischaemic risk factors. It is crucial to recognise these anomalies, as it can avoid sudden cardiac death with appropriate surgical management. In our case report the patient was admitted with atypical chest pain and angiography was carried out on the basis of abnormal ECG. LCA has anomalous origin from the right coronary sinus of valsalva and adapts interarterial course between aorta and pulmonary artery (PA).

CASE PRESENTATION

A 67-year-old woman presented to the accident and emergency department with central chest pain for the past 4 months. She described the pain as severe, retrosternal, intermittent, indigestion/burning type, with radiations to the left arm. She had used antacids with no relief. Her medical history included hypertension, chronic obstructive pulmonary disease, pulmonary fibrosis, left mastectomy for breast cancer, hypercholesterolaemia and osteoarthritis. Her medications included anastrozole, indapamide, perindopril, aspirin, clopidogrel, atorvastatin, salbutamol and atrovent inhalers. She was a non-smoker and vegetarian. Two brothers each had a myocardial infarction when in their early 40s.

On examination the patient's pulse was 77 bpm, regular, blood pressure 166/75 mm of Hg, temperature 36.9 degree centigrade, respiratory rate 16/min with 97% saturation on air by pulse

oximetry. Cardiovascular, respiratory and abdominal examinations were unremarkable.

INVESTIGATIONS

Investigations including full blood count, biochemistry, liver function tests, coagulation screen, amylase, C reactive protein, thyroid functions tests and parathyroid hormones were normal. The initial and 12 h troponins were less than 3 ng/L.

ECG showed left ventricular hypertrophy, ST depression in anterolateral leads and biphasic T waves.

Diagnostic angiogram was arranged which showed normal dominant right coronary artery (figure 1). The left main coronary artery arose from the right coronary sinus and appeared to pass between PA and aorta (figures 2). To further delineate the course a CT coronary angiogram was ordered.

CT coronary angiogram was performed which showed that the right and the left coronary arteries were arising from the right coronary sinus with left main coronary artery seen in the retropulmonary location (figure 3) and subsequently dividing into the left anterior descending and circumflex arteries (figure 4).

OUTCOME AND FOLLOW-UP

Initially, the index case was followed up for a few months when she again started getting symptomatic

Figure 1 Left anterior oblique view (LAO) of coronary angiogram showing normal dominant right coronary artery (A).

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To cite: Waleed M, Raza A, Minhaj T, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-203780

Figure 2 LAO of coronary angiogram showing left main coronary artery arising from the right coronary sinus (B) and right coronary artery also arising from right coronary sinus (C).

and developed worsening anginal pain. Subsequently, the case was discussed in a cardiology-cardiothoracic multidisciplinary meeting and it was thought that symptoms were likely due to compression of the left coronary system. Hence, the patient was referred to cardiothoracic colleagues for a possible left internal mammary artery graft to left anterior descending artery.

DISCUSSION

We present an interesting case in which the left main coronary artery arises from the right coronary sinus and then the anomalous left main coronary artery takes the interarterial course between aorta and PA. In the general population, the prevalence of coronary artery arising from the opposite sinus is around 0.2–2.0%.¹ In one of the studies, in which 38 703 patients were observed by performing their coronary angiograms to look for coronary anomalies, it was found that out of 601 cases of coronary anomalies only 9 cases (1.5%) had anomalous origin of

Figure 3 Two-dimensional view of CT coronary angiogram showing the right and left coronary arteries arising from the right coronary sinus (D) with left main coronary artery seen in the retropulmonary location (E).

Figure 4 Three-dimensional view of CT coronary angiogram showing the right and left coronary arteries arising from the right coronary sinus (F) and subsequently dividing into the left anterior descending and circumflex arteries (G).

coronary artery from opposite sinus (ACAOS).² It is debatable whether the anomalous origin of the coronary arteries have any long-term implications or not, but in the majority of cases there is no haemodynamic implications or effect on prognosis.¹ In some cases, ischaemia and sudden cardiac death can result if the anomalous coronary artery takes an interarterial route to reach the area of myocardial supply,¹ as in our case, where the anomalous artery took an interarterial course between aorta and PA after origin.

On the basis of the course of the left main coronary artery after anomalous origin, the anomalous coronary arteries can be classified into four types: those passing anterior to the right ventricular flow tract (type A), between the aorta and PA (type B), through the crista portion of the septum (type C) and dorsal to the aorta (type D).^{3 4} In our case the LCA followed type B course to reach its myocardial territory.

In conclusion, ACAOS could be an incidental finding during angiography/CT angiography, but as it can be symptomatic and may lead to sudden cardiac death, especially when it adapts to an interarterial course, the clinician should be aware of this condition and its prevalence.

Learning points

- ▶ Angiographic findings of such an anomaly, especially in such group patients, must be sometimes considered even in the absence of obvious cardiac risk factors.
- ▶ Appropriate recognition can avoid possible sudden cardiac death with cardiac surgical management.
- ▶ Anomalous origination of the coronary artery from the opposite sinus can be an incidental finding with the growing use of CT coronary angiography for routine health checkups, but it can precipitate ischaemia and sudden cardiac death, typically when it is associated with an interarterial course, as in this case.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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