CASE REPORT

Asymptomatic anomalous left anterior descending artery arising from the right coronary artery with a rare anterior course

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SUMMARY

The presence of a malignant course on the coronary circulation is the second leading cause of sudden cardiac death in young adults. One type of malignant conformation is an anomalous left anterior descending artery (LAD) arising from the right coronary artery (RCA). In a study examining 70 850 patients undergoing coronary angiography, the prevalence of this anomaly was noted in 0.006% of total patients and in 2.3% of congenital coronary anomaly cases. Of the four patients presenting with this anomaly, only one was noted to have an interarterial course of the LAD between the aorta and pulmonary artery. We describe the case of a patient who was incidentally found to have a malignant anomalous LAD arising from the RCA when he presented with a non-ST elevation myocardial infarction due to a ruptured plaque in an obtuse marginal branch. This patient survived for 57 years with no symptoms.

BACKGROUND

Malignant congenital coronary anomaly (CCA) has been usually treated with surgical revascularisation.^{1 2} We present a case of malignant CCA in an older adult who was incidentally found to have this anomaly. He was assessed with non-invasive tests which demonstrated the absence of ischaemia at maximal exercise and therefore, it was decided to pursue a conservative approach. The patient remains asymptomatic after a year of follow-up.

CASE PRESENTATION

A 57-year-old man, heavy smoker with no previous medical history, presented to the emergency room with retrosternal chest pain and was diagnosed with non-ST elevation myocardial infarction (NSTEMI). He underwent cardiac catheterisation with percutaneous coronary intervention (PCI) of the first obtuse marginal branch (OMB) of the circumflex artery, which arose from the left sinus of Valsalva. Incidentally, he was found to have a malignant left anterior descending artery (LAD) configuration that coursed anterior to the aorta (figure 1). This anomaly was better illustrated by a coronary CT angiography, which confirmed the LAD arising from the proximal segment of the RCA, with a course between the aorta and the right ventricular outflow tract, just inferior to the pulmonary artery root, and therefore not in a malignant interarterial pathway (figures 2 and 3).

Figure 1 Left anterior descending artery (double arrow) seen arising from the right sinus of Valsalva during cardiac catheterisation in anteroposterior cranial view.

Considering the patient's age and the lack of previous symptoms, he was not considered for immediate surgical intervention. The patient returned 8 weeks later to perform a maximum exercise stress test with tetrofosmin-labeled myocardial perfusion scintigraphy to assess the potential hypoperfusion of the LAD territory. The patient was able to exercise to 10 METS and 95% of his age predicted heart rate on the regular Bruce protocol with no symptoms other than fatigue. Nuclear images obtained demonstrated no signs of ischaemia or hypoperfusion in the anterior or anteroseptal walls (figure 4). The only positive finding was a moderate fixed defect of the anterolateral wall with partial reversibility, consistent with the OMB territory, previously treated with PCI for the NSTEMI (figure 4).

Although a favourable result of a nuclear scintigraphy on maximum exercise stress test does not grant immunity from sudden cardiac death (SCD); this patient opted for conservative management and clinical follow-up. Six months later, the patient remains asymptomatic and engages in a moderate level exercise programme.

OUTCOME AND FOLLOW-UP

The patient was free of cardiovascular events after 1 year.

DISCUSSION

In general, patients with an anterior course of the LAD will present with SCD earlier in life with initial presentation during a period of physical activity.³ Historically, survivors of SCD or the rare patients who present with symptoms (angina,

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Figure 2 CT angiography showing the left anterior descending artery (arrows) taking off from the proximal segment of the right coronary artery (A) and coursing behind the right ventricle outflow tract and in front of the aorta (B).

ventricular tachycardia or syncope) have been successfully treated with surgical correction.

Several parameters have been considered to determine those patients who are at increased risk of SCD and require intervention. Differences in length of aortic intramural segment, coronary ostial size, degree of displacement of the anomalous artery from the correct coronary sinus or angle of coronary takeoff between patients with and without SCD have been studied. All pathological features showed considerable interpatient variability with the exception of age greater than 30 years, which was

associated with lower mortality.³ Although patients above 30 years may be at a decreased risk of SCD, it is important to determine if the patients who were found incidentally due to acute coronary syndrome or other disease should be indicated for surgery. Although surgical intervention for some forms of CCA is feasible with good early results and is clearly indicated for symptomatic patients, no definitive best practice has been established for the management of those identified serendipitously without symptoms.

According to a recent report, the mortality risk of surgical repair in CCA patients is around 1.5%. Given the mortality risk, the risk for SCD must outweigh those from surgical complications. In a study examining clinical angiographic and haemodynamic findings in patients with CCA, it was suggested that the isolated angiographic demonstration of an anomalous LAD from the right sinus of Valsalva in an adult with mild cardiac symptoms is not an indication for prophylactic surgical correction.⁴ As our patient had neither clinical symptoms nor myocardial perfusion imaging consistent with exercise induced ischaemia, we feel comfortable continuing with the conservative management of this patient and foregoing surgical intervention.

Figure 3 CT angiography with three-dimensional reconstruction showing the anterior course of the anomalous left anterior descending artery (arrow), however, below the pulmonary artery root at the level of the right ventricle outflow tract.

Learning points

- ▶ Malignant congenital coronary anomaly (CCA) has to be considered every time a new CCA is diagnosed.
- ▶ Although malignant CCA has been treated with a surgical revascularisation of the coronaries, non-invasive assessment of ischaemia should be performed before definitive treatment.
- ▶ Although CCA is the second leading cause of sudden cardiac death in young adults, not necessarily older asymptomatic adults will need surgical revascularisation.

Figure 4 Scintigraphic images taken after stress (first and third rows) and at rest (second and fourth rows), with moderate reversibility seen in the lateral wall. No stress-induced hypoperfusion is seen in the area supplied by the anomalous left anterior descending artery (septal and anterior walls).

Competing interests None.

Patient consent Obtained.

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