CASE REPORT

Incidental finding of anomalous circumflex coronary artery from right coronary sinus prior to aortic valve surgery

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SUMMARY

Anomalous origin of the left circumflex (Cx) artery is a common and mostly benign coronary artery anomaly. We report the case of a man aged 52 years who presented to his local hospital with progressive breathlessness on exertion and syncopal episodes. His admission transthoracic echocardiography (TTE) showed bicuspid aortic valve, severe aortic stenosis with a valve area of 0.5 cm² and his left ventricular ejection fraction (LVEF) was 27%. His coronary angiogram showed normal coronary arteries but anomalous origin of the Cx artery from the right coronary. He underwent elective bioprosthetic aortic valve replacement. His postoperative recovery was uneventful and he was discharged on day 5 postoperatively. His TTE postoperatively showed well-seated aortic valve, improved LVEF to 51%. We here report a case of incidental finding of anomalous Cx artery arising from the right coronary while the patient is being worked up for aortic valve replacement for congenital bicuspid aortic valve.

BACKGROUND

Anomalous origin of the left circumflex (Cx) artery is a common and mostly benign coronary artery anomaly. The incidence of this anomaly is 0.08–0.67%, in most cases, it remains asymptomatic; however, it can create a challenge during coronary artery intervention, coronary artery bypass surgery or prosthetic valve replacement.^{1–3} Such anomaly if not recognised and dealt with cautiously, it can be injured during aortic valve replacement or compressed by the prosthetic valve ring causing significant myocardial ischaemia.

CASE PRESENTATION

A man aged 52 years presented with progressive breathlessness on exertion to his local hospital, this was associated with burning sensation in his throat, lethargy and syncopal episodes. His medical history included that he was an ex-smoker and with well-controlled arterial hypertension. His admission chest X-ray was normal, ECG showed normal sinus rhythm, transthoracic echocardiography (TTE) revealed bicuspid aortic valve, peak gradient across aortic valve was 55 mm Hg with a mean gradient of 35 mm Hg, severe aortic stenosis with aortic valve area of 0.5 cm², dilated LVEF of 27% and left atrial dimension of 3.4 cm²; no other pathologies were detected.

Coronary angiogram was performed as part of workup for aortic valve replacement and it revealed

no evidence of coronary artery disease; however, there was an anomalous origin of the Cx artery from the right coronary which was of normal calibre (figure 1, video 1).

His native aortic valve was replaced with a size 29 C-E Magna Ease aortic valve bioprosthesis as per

Figure 1 Coronary angiogram photo caption showing anomalous origin of the circumflex artery from the right coronary.

Video 1 Coronary angiogram showing normal calibre but anomalous circumflex coronary artery from the right coronary artery.

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patient's preference. Surgery was performed with minimal access sternotomy to fourth intercostal space.

The patient's postoperative recovery was uneventful and he was discharged on fifth day after the surgery in good health. A follow-up TTE revealed a well-seated prosthetic aortic valve, with mean pressure gradient of 9 mm Hg, left atrial area of 2.4 cm² and improved LVEF to 51%.

INVESTIGATIONS

- ▶ Transthoracic echocardiography which showed evidence of severe aortic stenosis, aortic valve area of 0.5 cm².
- ▶ Coronary angiogram showing anomalous origin of the Cx coronary artery from the right coronary.

TREATMENT

The patient underwent aortic valve replacement with a size 29 C-E Magna Ease aortic valve bioprosthesis as per patient's preference. Surgery was performed with minimal access sternotomy to fourth intercostal space.

OUTCOME AND FOLLOW-UP

Patient's postoperative period was uneventful and he was discharged home on fifth postoperative day.

DISCUSSION

Anomalous origin of the left Cx artery from either the right sinus Valsalva or the right coronary artery has been described previously as the most common of all congenital coronary anomalies with a prevalence of 0.08–0.67%.^{1–3} Congruent with the case presented, anomalous Cx artery is reported to be more likely in patients with bicuspid aortic valve.⁴ This anomaly is classified as benign since it is not associated with sudden cardiac arrest.⁵ In recent studies, anomalous origin of Cx artery does not increase the risk of atherosclerotic changes despite its acute angulation.^{2, 5} Therefore, anomalous origin of Cx artery from the right coronary can be asymptomatic until later age of adult life and is often diagnosed incidentally or even remains undetected. However, it may present with angina on exercise due to systolic compression of the Cx artery by the aorta.^{6, 7}

The impact of an anomalous origin of Cx artery on procedures involving the coronary arteries, aortic root or aortic valve is evident.⁴ Failure to recognise such coronary anomaly may lead to life-threatening events. Therefore, a preprocedural coronary angiogram is crucial to reveal the anatomical landmarks. Alternatively, cardiac CT scan can be used as a less invasive technique to identify coronary anomalies prior to surgical interventions.^{6, 7}

Owing to the close proximity of Cx artery with anomalous origin to the aortic valve, particular attention should be given to procedures involving aortic valve replacement as there is higher risk of injuring the Cx artery while suturing the replaced aortic valve.⁸ Coronary vessels might also be compressed by the prosthetic valve ring, leading to myocardial ischaemia in the relevant territory.^{4, 9} Depending on the exact origin of the anomalous Cx artery, a sutureless valve could potentially give a safer approach as suggested by Giuseppe Cerillo *et al.*¹⁰

In conclusion, regardless of age, sex and comorbidities of the patient who undergo aortic valve surgery, a thorough coronary angiogram preoperatively is recommended to assess the exact coronary anatomy and avoid catastrophic complications perioperatively.

Learning points

- ▶ Circumflex (Cx) coronary artery anomaly can be asymptomatic until advanced age of life and may never present.
- ▶ Coronary artery angiography is crucial prior to aortic valve surgery to understand coronary anatomy and alert surgical team to take extra steps to avoid injury of any previously undetected coronary anomaly.
- ▶ More studies are required to set recommendations for sutureless aortic valve replacement in patients with significant Cx coronary anomaly from the right coronary artery.

Contributors AHO and MUA have drafted the case report, AHA supervised the writing, reviewed and amended accordingly. RU is the responsible cardiac surgeon who operated on the patient.

Competing interests None declared.

Patient consent Obtained.

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