

Coronary artery aneurysms: the chest pain “zebra”

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ABSTRACT

Coronary artery aneurysms (CAAs) are defined as entire wall dilatation to 1.5 times the size of the adjacent normal vessel. They can present as chest pain with electrocardiogram (ECG) changes, mass effects or rupture with tamponade. This case describes the presentation of a patient with a ST elevation myocardial infarction and concurrent end stage renal failure, and the options for treatment in this rare condition.

Coronary artery aneurysms (CAAs) are defined as entire wall dilatation to 1.5 times the size of the adjacent normal vessel.^{1,2} The incidence of CAAs is 0.8% and is more commonly seen in males, those with coronary artery disease (CAD) or previous myocardial infarction.¹

Case report

A 51-year-old male presented with chest pain. He had end stage renal failure due to membranous nephropathy and interstitial nephritis. He also had hypertension, thromboangiitis obliterans and was an ex-smoker with 15 pack-year history. His electrocardiogram (ECG) showed V2–V6 ST elevation and an echocardiogram showed apical and lateral wall akinesis.

Angiography revealed an occluded left anterior descending (LAD) aneurysm and a patent right coronary artery (RCA) aneurysm (Figure 1). One attempt at angioplasty of the LAD identified possible fistulation to the coronary sinus; further attempts at restoration of blood flow were abandoned in favour of illuminating the anatomy.

The patient proceeded to CT coronary arteries (CTCA), which showed a 57mm proximal-mid LAD thrombosed CAA and a 38mm mid RCA coronary aneurysm with 70% pre-aneurysm and 50% post-aneurysm stenosis. No fistula to the coronary sinus was identified.

Due to his acuity with regards to his ongoing ischaemia and concerns for stability with positioning, his internal mammary artery grafts were ruled out. His radial arteries were also likely to be needed for future AV fistula formation; therefore, his definitive management was saphenous vein grafting. His first graft was to LAD and the diagonal, and the second was to the RCA.

Due to the risk of distal embolization from the aneurysms, subsequent distal and proximal ligation of the aneurysms was performed (Figure 2). This also prevents future rupture. This was initially an off-pump surgery; however, due to significant instability on RCA arteriotomy, this was converted to an on-pump beating heart approach.

In ICU he required noradrenaline and argipressin. This was weaned, and he was stepped down to ward level care on day 2 post-operation. He was discharged on day 8 post-operation with an anticoagulation plan for 12 months of Ticagrelor 90mg BD and lifelong aspirin 100mg OD.

Discussion

Coronary artery aneurysms have been reported to have an incidence of between 0.3% and 12%, dependent on definition of CAA used and population studied. A recent study gave an incidence of 0.8% from a sample size of 51,555 over 11 years.¹ The LAD is most commonly affected, with the RCA coming second.¹

The presence of CAAs have been associated with active tobacco smoking (67%), hypertension (65%), dyslipidaemia (65%), diabetes mellitus (28.5%) and obesity (25%).¹ In 6.25% another arterial aneurysm had already been identified, and 49.6% had already had concomitant CAD diagnosed.¹

The presentation is most commonly via ischaemic symptoms from associated CAD, thrombosis or distal embolization. Stress-induced ischaemia due to microvascular dysfunction without obstruction can also be seen. Other presentations can include mass effect or rupture leading to tamponade.^{2,3}

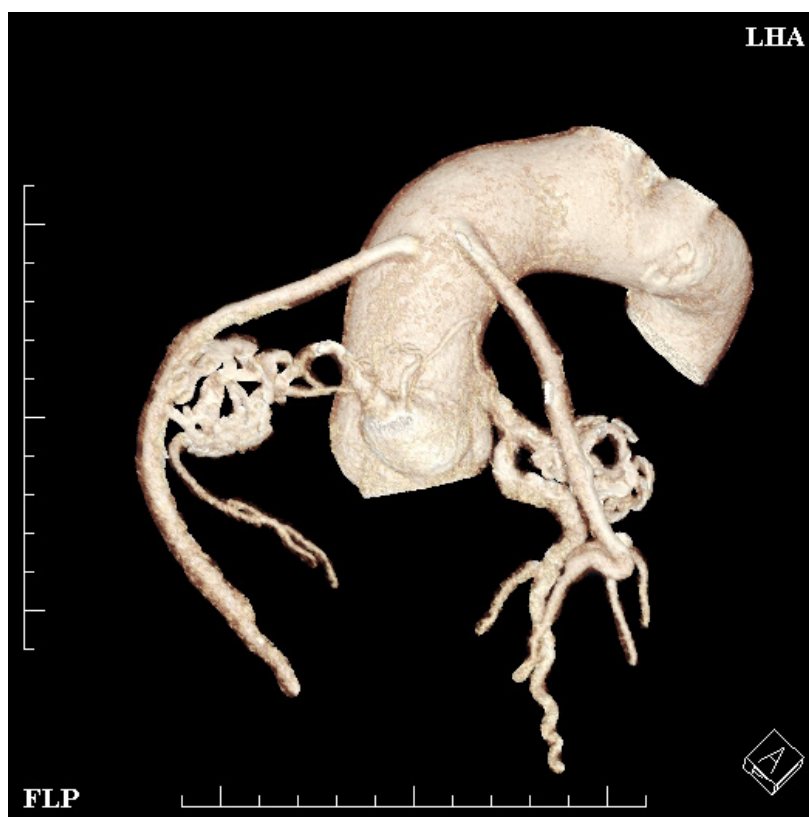
Figure 1a: Angiographic image of the occluded LAD aneurysm.



Figure 1b: Angiographic image of the patent RCA aneurysm.



Figure 2: 3D reconstruction of post coronary artery bypass grafting CT coronary arteries, detailing both saphenous vein grafts and the native coronary artery aneurysms 9 months post his cardiac surgery.



The pathophysiology is thought to be most commonly atherosclerotic in origin. The development begins with destruction of the arterial media, thinning of the arterial wall, increased wall stress and subsequent progressive dilatation of the vessel.² Kawasaki disease results in the majority of paediatric CAAs.² Other mechanisms include mechanical injury such as during stent insertion, genetic susceptibility, autoimmune disease and infection.²

Treatment course is a decision based on the presentation, the patient's anatomy and their other comorbidities.

Medical management includes aggressive risk factor modification, including smoking cessation, lifestyle change and reduction in cholesterol level.² Other options include antiplatelet therapy and anticoagulation, neither of which have high-quality evidence for their benefit.^{1,2}

Interventional options will depend on size

and length of the lumen and CAA, respectively. If an aneurysm is distant from side branches, then a covered stent can exclude the aneurysm; additionally, embolization coils can be used concurrently.^{2,3} Interventionally approached CAAs with STEMIs are associated with increased mortality and in-stent re-stenosis during intermediate follow-up.³

Surgical options include excision, marsupialisation with interposition graft, or ligation at the proximal and distal extents with bypass grafting.² These surgeries are so uncommon that there is little evidence of the superior surgical technique.³

This unusual case of coronary artery aneurysms presenting as a STEMI illustrates the importance of awareness of niche differentials for seemingly straightforward presentations. With swift diagnosis and surgical intervention this patient has benefited from an excellent outcome.

COMPETING INTERESTS

Nil.

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