A Giant Thrombosed Right Coronary Artery Aneurysm Presenting as an Obstructing Left Atrial Mass

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Introduction
Coronary artery aneurysms (CAA) may be congenital or, as is more often the case, acquired. There is a higher reported incidence in males. Atherosclerotic coronary artery disease is the aetiological factor in 50% of CAA cases. Lipid and hyalin intimal deposits, disruption of the tunica media, focal calcification and cholesterol crystalline residues on histological examination signal atherosclerotic aneurysmal disease [2]. Other acquired causes include trauma, connective tissue disorders such as Marfan syndrome and Ehlers Danlos Syndrome and inflammatory arteritides such as Kawasaki disease, Takayasu arteritis and Behcet's disease [3]. The most commonly affected artery is the RCA. Patients with thrombosed giant coronary arteries may be asymptomatic but generally they experience anginal chest pain, dyspnoea and palpitations.

Case Presentation
A 63-year-old man presented with a long history of worsening syncope and vague chest pain. He was in sinus rhythm and computerized tomography (CT) of his brain was normal. He was a life-long smoker and did not use illicit substances. There was no relevant past medical history but his father was diagnosed with an infra-renal aortic aneurysm as well as bilateral femoral artery aneurysms.

Echocardiography (ECHO) revealed a 60 x 80 x 69mm mass of variable echogenicity adjacent to the posterior mitral annulus, occupying almost the entire atrial cavity (Fig 1) and severely depressed left ventricular function. A large left atrial myxoma was suspected on the basis of these findings. At angiography a very ectatic right coronary artery (RCA) gave rise to a normal posterior descending branch and a guide-wire could not be advanced beyond this point, even though contrast appeared to fill a dilated

Figure 1. Capture image of ECHO showing a mass occupying most of the left atrial cavity and impinging on the mitral valve
cul-de-sac that extended beyond the crux of the heart, with sluggish flow. No obvious point of fistulation could be identified between the coronary artery and a cardiac chamber. The left main, left anterior descending, circumflex and obtuse marginal arteries were normal.

CT angiography confirmed a large RCA with no fistulae and a sessile, poorly-enhancing mass arising from the posterior atrial wall between the pulmonary veins, obstructing the mitral valve and, to a lesser extent, the left ventricular outflow tract (Fig 2). A working diagnosis of giant myxoma or sarcoma was established.

At surgery the pericardium appeared thickened and fibrinous and contained a sero-sanguinous effusion. The right coronary artery was immediately identified as a dilated, tortuous vessel running along the right atrioventricular groove. The heart could not be lifted on order to inspect the left atrio-ventricular groove. Via a Dubost trans-atrial approach [4], a firm broad-based mass was encountered completely filling the left atrium and obliterating vision of the mitral valve (Fig 3). Since no pedicle was present the atrial endocardium was incised and the mass debulked piecemeal. During attempted dissection of the mass from the surrounding left atrial wall no appreciable plane or capsule was identified. The core of the mass was completely excised, leaving an appreciable cavity in its place. The remaining left atrial endocardium was reconstituted, excluding this cavity, incorporating the tunica adventitia of the aneurysm into the suture line. Dissection of the inferior circumference of the mass left large defects in the mitral valve annulus, which necessitated its replacement with a Carbomedics® size 27 mitral valve prosthesis. The contents of the mass appeared grossly inhomogenous, with dark red gelatinous areas interspersed with strands of fibrotic tissue. Post-operatively the patient was supported with an intra-aortic balloon pump and was returned to theatre a few hours later for control of significant bleeding. His recovery was otherwise satisfactory. Histology revealed thrombus formation surrounded by aneurysmal arterial intima. Bacteriology revealed no organisms and yielded no growth.

Discussion
Coronary angiography, trans-thoracic echocardiography (TTE), computed tomography coronary angiography (CTCA) and magnetic resonance imaging (MRI) have all been employed in the diagnosis of thrombosed giant coronary artery aneurysms. In our case, CTCA and TTE were suggestive of a left atrial mass but no relation to the right coronary artery (RCA) aneurysm could be ascertained. Our patient presented with syncope secondary to the left ventricular inflow and outflow tract obstruction caused by the impeding mass-effect of his thrombosed right coronary artery aneurysm. Coronary angiography outlined the dilated right coronary system but flow through its distal branch, beyond the posterior descending artery (PDA), was absent because of complete thrombosis of the aneurysmal segment impinging on the left atrium. Resection of this segment did not involve the origin of the PDA, sparing the patient acute inferior myocardial ischaemia.

The management of coronary arterial aneurysms consists of medical therapy, stent insertion or surgical correction. For giant thrombosed aneurysms causing a mass effect, surgery is recommended. When the distal coronary artery is aneurysmal, resection of this segment is indicated, as in our case. With proximal lesions, resection and coronary artery bypass grafting (CABG) appears to be the most frequently chosen strategy. Where the coronary artery is diffusely ectatic, thrombectomy and CABG without coronary resection has been performed with good effect [5]. Covered stents with long term anticoagulant and antiplatelet therapy have also been described [6].

In a review of 28 reported cases of aneurysms exceeding 5cm

![Figure 2](image1.png) Figure 2. Capture image of CT angiogram showing mass in two planes

![Figure 3](image2.png) Figure 3. Scheme of operative findings: The RCA aneurysm is shown in red, occupying the left atrial cavity.
in size, 23 involved the proximal RCA, 19 underwent surgery of whom one died and two others had an unstated outcome. Of eight patients treated conservatively five died, two had an unstated outcome and one had a successful outcome. One patient who underwent a percutaneous intervention did well [1,7].

With such an array of medical and surgical treatment options at hand, we can only anticipate that this condition will be managed on an individual basis, with the backing of angiography, cross-sectional imaging and echocardiography to establish the diagnosis.

**Conclusion**

Experienced surgeons respect the fact that there are certain rare situations when surgical exploration becomes necessary to define the nature of a disease. Consideration should be given to the possibility of thrombosed aneurysmal arteries in the investigation of intra-myocardial masses and intra-cardiac tumours. One should remain sensitive to the fact that even the ‘gold standard’ imaging modalities may fail to correctly outline a thrombosed segment of a coronary artery aneurysm and an index of suspicion should be reserved for this condition. Finally, coincidence should rarely be accepted in the face of dual pathology in a cardiac surgical patient. Clues to the true diagnosis included the ectatic RCA and a positive family history of aneurysms at other vascular sites.

**Declarations of interest**

The authors declare no conflicts of interest

**Acknowledgements**

The authors state that they abide by the “Requirements for Ethical Publishing in Biomedical Journals” [8].

**References**