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# Giant right coronary artery aneurysm presenting as cardiac tamponade

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## Abstract

Giant coronary artery aneurysms are rare and have variable presentations, which range from an incidental finding to sudden death. We report a case of a female presenting with chest pain and signs of cardiac tamponade who underwent a computed tomography (CT) pulmonary embolus protocol and was found to have haemopericardium with accumulation of contrast adjacent to the aorta. She underwent emergent sternotomy and was found to have a ruptured giant right coronary artery aneurysm, which was ligated and bypassed. This report highlights the difficulty of diagnosing a ruptured giant coronary artery aneurysm via CT and provides valuable information on an atypical presentation.

**Keywords:** Coronary artery disease • Aneurysm • Cardiac tamponade

## INTRODUCTION

Giant coronary artery aneurysms (CAAs) are very rare clinical entities with extremely variable clinical presentations according to a limited number of case reports [1]. We present a case of a giant right coronary artery (RCA) aneurysm in a patient presenting with chest pain who was subsequently found to have cardiac tamponade.

## CASE

A 61-year-old transgender male-to-female with a history of obstructive sleep apnoea and chronic lymphoid leukaemia (Stage 0, untreated) presented to an outside hospital with acute-onset substernal chest pain and a syncopal episode. Serum troponin levels were within normal limits, and an electrocardiogram identified sinus tachycardia with several premature atrial complexes as well as a right bundle branch block and a left anterior fascicular block. The patient did not have a previous electrocardiogram for comparison. A computed tomography (CT) pulmonary embolism protocol identified a large haemopericardium with accumulation of contrast adjacent to the aortic root, which was concerning for a ventricular aneurysm (Fig. 1). The haemopericardium was confirmed on transthoracic echocardiography and was noted to have mass effect on the right ventricle with right ventricular free wall diastolic collapse and a plethoric inferior vena cava. There was no evidence of aortic valve regurgitation or an intimal flap or false lumen within the ascending aorta, making an ascending aortic dissection less likely. However, as the CT angiogram was based on a pulmonary embolism protocol, the

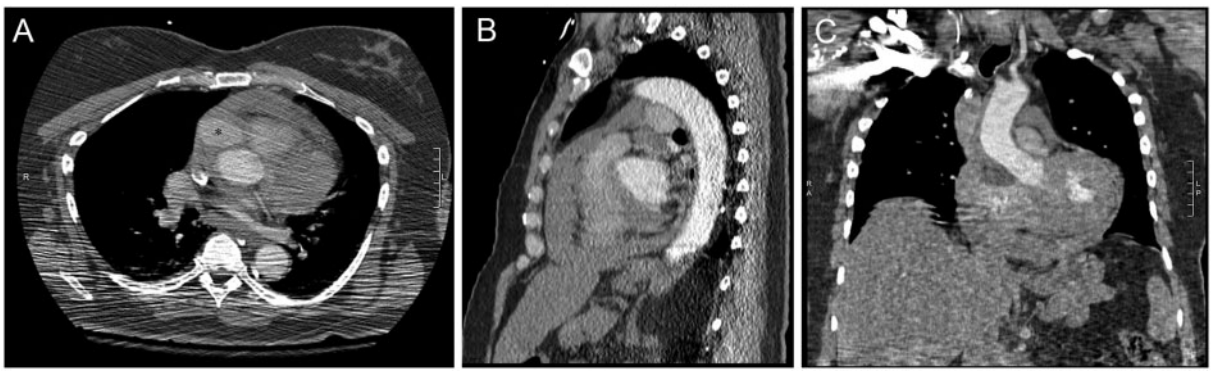


**Figure 1:** Chest computed tomography demonstrating a large haemopericardium with accumulation of contrast adjacent to the aortic root on (**A**) transverse view (asterisk), (**B**) sagittal view and (**C**) coronal view.

timing of intravenous contrast was not ideal for visualization of the aortic lumen.

Given the absence of a history of myocardial ischaemia or Takotsubo disease, a diagnosis of a right ventricular aneurysm or free wall rupture seemed unlikely. However, based on presentation, imaging, status of the patient and the absence of myocardial ischaemia, operative exploration was deemed to be the best option. After being transferred to our institution, she underwent emergent sternotomy for operative exploration (Video 1). While opening the pericardium, we found a large mass along the right ventricle with no active bleeding at that time (Fig. 2). After initiating cardiopulmonary bypass, the mass was opened and noted to be a 3- × 4-cm aneurysm originating from the RCA with an identifiable site of contained rupture. The proximal and distal aneurysms were ligated and then bypassed with autologous saphenous vein. The patient came off of cardiopulmonary bypass without complication and was transferred to the intensive care unit. She was discharged without complications on postoperative day 8.

Pathology report of the RCA aneurysm tissue sample revealed no evidence of vascular trauma or inflammation. Mild atherosclerosis and vessel wall changes were present, which suggested a diagnosis of a long-standing vasculopathy consistent with hypertension. However, no conclusive aetiology could be determined. The patient has recovered well 6 months post-procedure.


**Video 1:** Intraoperative identification and treatment of a giant right coronary artery aneurysm.

## COMMENT

A CAA is defined as a dilation of the coronary artery that exceeds 1.5–2 times the diameter of the adjacent lumen and is considered a giant aneurysm if it exceeds 4 cm in diameter [2]. Giant RCA aneurysms are exceedingly rare, with an estimated incidence of 0.02% [2]. CAAs are most commonly asymptomatic, but when symptomatic, their presentations range from angina pectoris and myocardial ischaemia to rupture and sudden death.

The underlying pathogenesis of CAAs is currently poorly understood. CAAs in adults are most commonly reported in association with coronary artery atherosclerosis; however, it is unclear whether coronary artery atherosclerosis is in the causative pathway [2]. CAAs have also been associated with several other common comorbidities including hypertension, diabetes mellitus and dyslipidaemia [3]. CAAs have also been reported in patients with systemic inflammatory diseases, connective tissue diseases, Kawasaki disease, cocaine use, trauma and congenital vascular malformations, as well as following stenting or angioplasty.

Most RCA aneurysms are asymptomatic and are detected incidentally by angiography or echocardiography. In our case, haemopericardium was identified using CT and confirmed using echocardiography, but the RCA aneurysm was identified only intraoperatively. Although imaging on CT was consistent with a contained rupture of a ventricular aneurysm (accumulation of contrast adjacent to the aorta in the context of cardiac tamponade), the absence of a history of myocardial ischaemia or Takotsubo disease made this unlikely. However, a ventricular aneurysm still seemed more likely than a ruptured giant CAA. Once a CAA is diagnosed, the prognosis is generally favourable and similar to patients with similar overlapping risk factors [4]. However, given the paucity of data on giant CAAs and their prognosis, previous authors have suggested more aggressive treatment to prevent

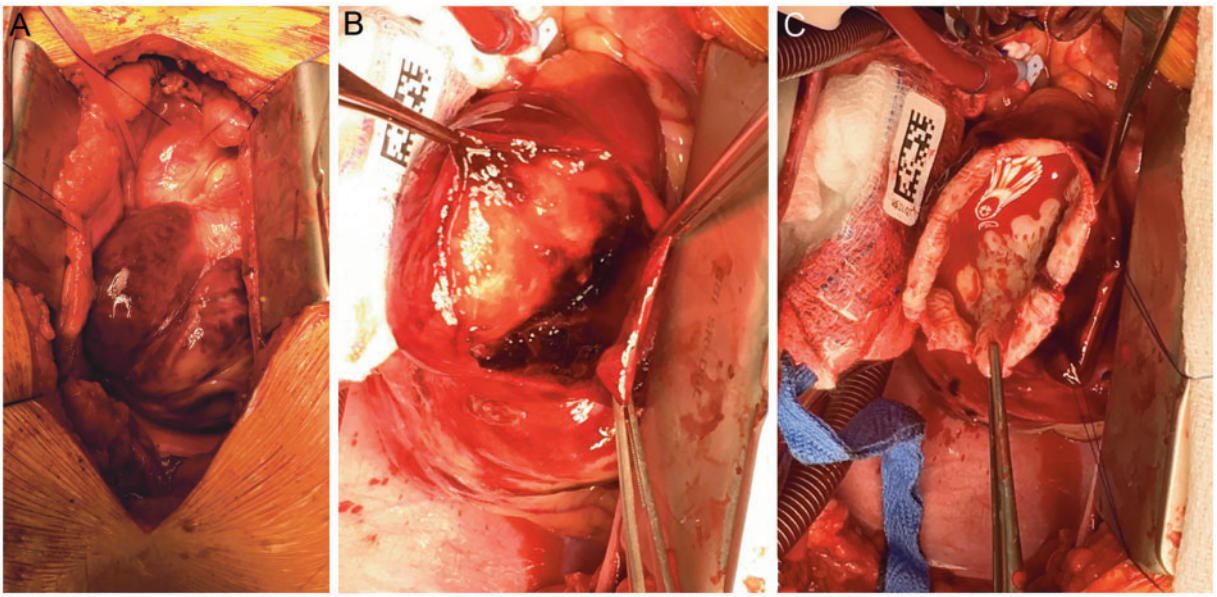


**Figure 2:** (**A**) Exposure of a large haemorrhagic mass on the right ventricle; (**B**) the mass identified as a giant right coronary artery aneurysm and (**C**) further dissection reveals a contained site of rupture.

potentially fatal complications [5]. Medical and surgical methods of treatment have been reported; however, the size of the aneurysm and acuity of presentation have dictated treatment in the majority of cases. Giant CAAs are generally managed with surgical intervention (stent placement or surgical resection) given their suspected higher risk for complications [1].

Given the variability and potential acuity of clinical presentation with a giant RCA aneurysm, it is essential to include RCA aneurysms in the differential diagnosis of chest pain or cardiac tamponade. Additionally, given their overlapping risk factors (hypertension, connective tissue disorders and atherosclerosis), it is also important to consider an ascending aortic dissection. Chest CT and transthoracic echocardiography may not be able to reliably identify giant CAAs once they have ruptured.

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