



Surgical management of a giant left coronary artery aneurysm mimicking cardiac mass

Hong Zhu and Haisong Bu

Department of Cardiovascular Surgery, Xiangya Hospital, Central South University, Changsha, China

Brief Report

Cite this article: Zhu H and Bu H (2024) Surgical management of a giant left coronary artery aneurysm mimicking cardiac mass. *Cardiology in the Young* **34**: 2471–2473. doi: [10.1017/S1047951124026921](https://doi.org/10.1017/S1047951124026921)

Received: 25 August 2023

Revised: 17 July 2024

Accepted: 28 September 2024

First published online: 6 November 2024

Keywords:

coronary artery aneurysm; left coronary artery; treatment strategy; surgery; management.

Corresponding author:Haisong Bu; Email: buhaisong@csu.edu.cn**Abstract**

The giant coronary artery aneurysm is a very rare finding (0.02% of the general population), in which the right coronary artery is most often affected by aneurysms. Herein, we present a rare case of a giant left coronary artery aneurysm involving multiple major coronary arteries and compressing the cardiac cavity. The giant coronary artery aneurysm was opened and explored under cardiopulmonary bypass, and many mixed thrombi and calcified tissue were exposed. The patient was discharged uneventfully 7 days after surgery. The best management strategy at present is based on case reports, small case series, and personal experience. Treatment must be individualized according to the aetiology, location, symptoms, size, disease progression, the existence of infection, and the degree of any coexisting atherosclerosis. Surgery is a good alternative, particularly if a giant coronary artery aneurysm has a high risk of rupture and compressing the cardiac cavity. Even today, the treatment strategy is still open to debate and a clear evidence-based management strategy has not been established.

Introduction

The most common cause of coronary artery aneurysms is atherosclerosis (accounting for 50% in adults), while huge coronary artery aneurysm is very rare, with an incidence of about 0.02%.^{1,2} Giant coronary artery aneurysm is defined as a localised luminal dilatation with a diameter four times that of the reference vessel or an absolute value greater than 8 mm.³ Patients may be asymptomatic throughout their lives, but huge Coronary Artery Aneurysms (CCA) may also show myocardial infarction, aneurysm rupture, and sudden cardiac death.⁴ In terms of treatment strategy, cardiac surgery is the best solution, but it is still controversial¹, which largely depends on the experience and equipment of the hospital's cardiac team. Therefore, treatment methods must be personalised, and multidisciplinary teams, including interventional cardiologists, cardiothoracic surgeons, and radiologists, must work together to provide the best treatment for patients.

Presentation

A 38-year-old male with chest discomfort and suspected cardiac mass was transferred to our unit. The patient has no history of genetic diseases or Kawasaki disease. Chest radiography suggested the protrusion of the cardiac margin (Figure 1A, arrow). Transthoracic echocardiography showed an unknown mass near the apex of the ventricle and abnormally dilated left coronary artery (Figure 1B, arrow). Coronary CT angiogram revealed and confirmed a giant coronary artery aneurysm (75 mm x 43 mm) in the left coronary artery with mural thrombosis and calcification and abnormal origin of left anterior descending and left circumflex (Figure 1C and D, arrows). MRI further showed that the giant coronary artery aneurysm (Figure 2A and B, arrows, Supplementary Video 1) significantly compressed the septum and right ventricular apical segment, resulting in limited septal movement and right ventricular stenosis. Cardiac single photon emission computed tomography (SPECT) revealed the giant coronary artery aneurysm, deformed cardiac cavity, and areas of myocardial perfusion loss, and finally confirmed by coronary angiography, which showed the formation of the giant coronary artery aneurysm (Figure 2C and D, arrows, Supplementary Video 2). The giant coronary artery aneurysm (Figure 3A, dotted area) was opened and explored under cardiopulmonary bypass, and a large number of mixed thrombi and calcified tissue were exposed (Figure 3B). The patient was discharged uneventfully 7 days after surgery.

Comment

In 1761, coronary artery aneurysm was first described and defined.⁵ Its diameter is more than four times the diameter of the reference vessel, or if the diameter of coronary artery aneurysm is greater than 8 mm, it is called “giant,” while coronary artery dilatation directly exceeding 2 cm is very rare.^{3,5} The giant coronary artery aneurysm is a very rare finding (0.02% of the general

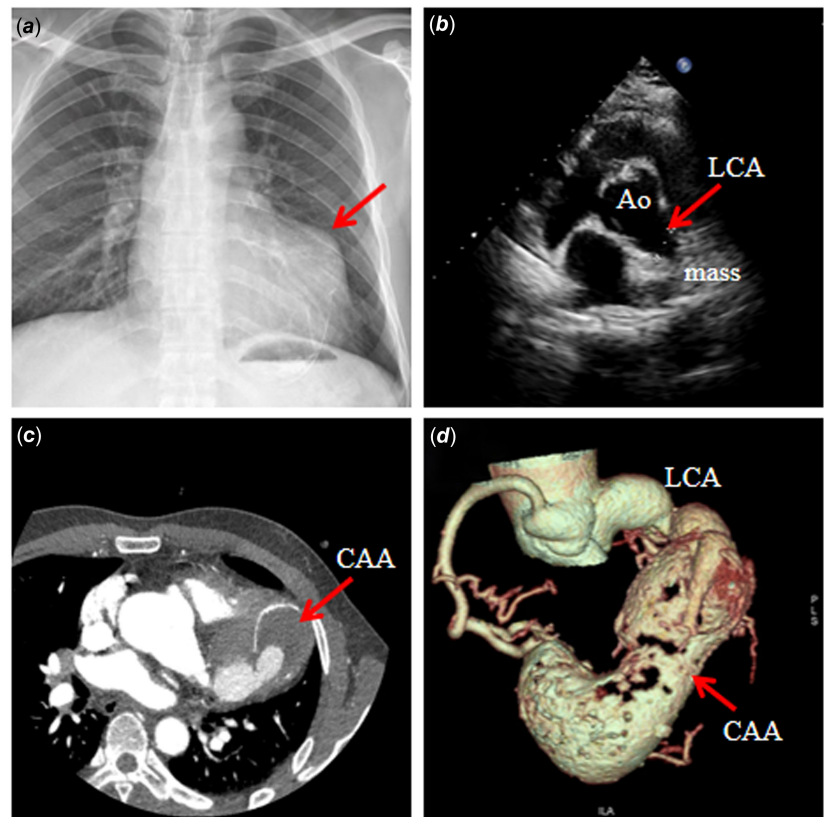


Figure 1. Chest radiography suggested the protrusion of cardiac margin (a); echocardiography showed an unknown mass and abnormally dilated left coronary artery (b); CT angiogram revealed giant coronary artery aneurysms (c and d). AO = Aorta; LCA = Left Coronary Artery; CAA = Coronary Artery Aneurysms.

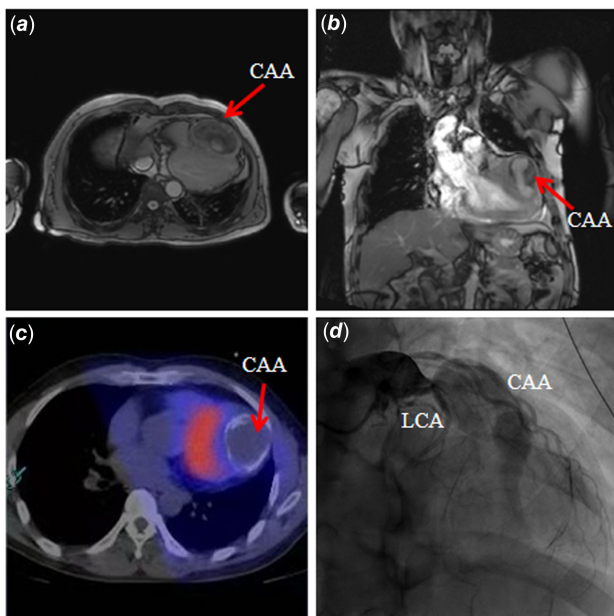


Figure 2. Magnetic resonance imaging (a and b), cardiac SPECT(c), and coronary angiography (d) revealed the giant coronary artery aneurysms. LCA = Left Coronary Artery; CAA = Coronary Artery Aneurysms.

population)^{1,3}, in which the right coronary artery is most often affected by aneurysms; however, the presence of coronary artery aneurysms in all 3 vessels or common trunk (left main) is a rare case.⁶ Coronary artery aneurysm is mainly asymptomatic and is often found by accident in coronary angiography. This diagnostic

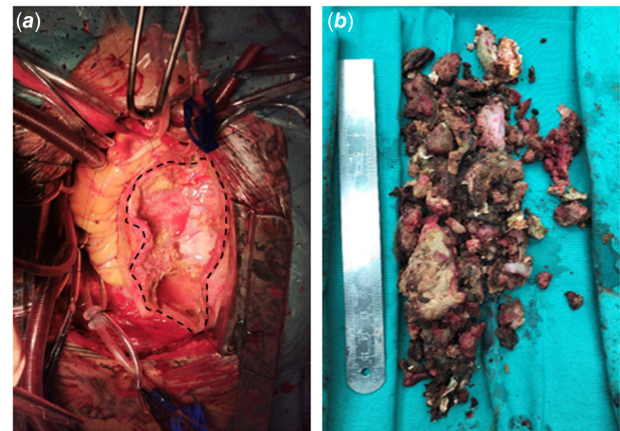


Figure 3. The giant coronary artery aneurysms (a) and many mixed thrombi and calcified tissue (b).

method can provide information about the size, shape, and location of coronary artery aneurysm, but it cannot reflect the information about the vascular wall. There is an underestimation of the actual size of an aneurysm, and even coronary artery aneurysm is ignored, because it may be blocked by a large thrombus or plaque. In recent years, intravascular ultrasound has been used to provide transmural images of coronary arteries, to obtain information about arterial wall structure and lumen composition.^{5,7} Most angiographically diagnosed aneurysms have the morphology of complex plaques or normal segments of adjacent stenosis, and only one-third are true or pseudoaneurysms.⁵ However, other non-invasive examinations, such as echocardiography, CT coronary angiography, and MRI, can be

used for the follow-up of suspected or treated coronary artery aneurysm patients.^{5,7}

Coronary artery aneurysm is an extremely rare disease. At present, there is no large-scale randomised clinical trial to compare the response of different treatment methods to coronary artery aneurysm. Therefore, the best management strategy at present is based on case reports, small case series, and personal experience. Treatment must be individualised according to the aetiology, location, symptoms, size, disease progression, the existence of infection, and the degree of any coexisting atherosclerosis. Even today, the treatment strategy is still open to debate. Asymptomatic coronary artery aneurysms should be treated with statins to block the inflammatory pathway leading to the development of coronary artery aneurysms.⁵ If thrombosis or embolism is a problem, long-term use of anti-platelets or anticoagulants should be considered. Percutaneous coronary intervention with stents can be used in patients with appropriate anatomy, but the risk of restenosis is high, especially in patients with coronary artery aneurysms > 10 mm.⁸ Surgery is a good alternative, particularly if a giant coronary artery aneurysm has a high risk of rupture and coexisting atherosclerosis. What's more, we also suggest that surgical treatment should be actively carried out in the following cases, such as coronary artery aneurysms with cardiac cavity compression; imaging findings showed a progressive increase of coronary artery aneurysms; coronary artery aneurysms from the aneurysm to distal coronary artery embolisation leading to myocardial ischaemia; fistula formation; and coronary artery aneurysms near the left trunk or branch.

Giant coronary artery aneurysms are very rare. Clinical manifestations may vary, and maintaining a high degree of suspicion is essential to avoid delayed diagnosis and increase the risk of cardiovascular complications. The management of coronary artery aneurysms remains a challenge and should be individualised to each patient based on a comprehensive clinical evaluation.

Moreover, the strategy also depends on the personal experience of the medical centre in treating this abnormality. However, a clear evidence-based management strategy has not been established.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S1047951124026921>.

Acknowledgements. We thank the patient for participating in this study.

Financial support. This study was supported by the Natural Science Foundation of Hunan Province (2022JJ40765) and the Natural Science Foundation of Changsha City, China (kq2202366).

Competing interests. The authors declare no conflicts of interest.

References

1. Bjelobrk M, Dodic S, Miljkovic T, et al. Asymptomatic giant aneurysm of the left anterior descending coronary artery: A Case Report and Review of the Literature. *J Tehran Heart Cent* 2020; 15: 178–182.
2. Nichols L, Lagana S, Parwani A. Coronary artery aneurysm: a review and hypothesis regarding etiology. *Arch Pathol Lab Med* 2008; 132: 823–828.
3. Kato H, Sugimura T, Akagi T, et al. Long-term consequences of Kawasaki disease. A 10- to 21-year follow-up study of 594 patients. *Circulation* 1996; 94: 1379–1385.
4. Zhang H, Xiao Z, Yang P, Hu J. Ruptured coronary artery aneurysm mimicking as a giant mediastinal mass. *Eur Heart J* 2021; 42: 1183.
5. El Khoury M, Anugu VR, Salmane C, Karam B, Imam M, Warchol A. Giant coronary artery aneurysm: a successful diagnosis. *Cureus* 2021; 13: e20429.
6. Jha NK, Ouda HZ, Khan JA, Eising GP, Augustin N. Giant right coronary artery aneurysm- case report and literature review. *J Cardiothorac Surg* 2009; 4: 18.
7. Maehara A, Mintz GS, Ahmed JM, et al. An intravascular ultrasound classification of angiographic coronary artery aneurysms. *Am J Cardiol* 2001; 88: 365–370.
8. Szalat A, Durst R, Cohen A, Lotan C. Use of polytetrafluoroethylene-covered stent for treatment of coronary artery aneurysm. *Catheter Cardiovasc Interv* 2005; 66: 203–208.