Accepted Manuscript online: 2023-10-16 Article published online: 2023-11-10

Large Ascending Aortic Pseudoaneurysm with Focal Dissection after Coronary Artery Bypass Surgery

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Thorac Cardiovasc Surg Rep 2023;12:e60–e62.

Abstract

Background There are many known complications that occur after surgical revascularization for patients with significant left main coronary artery disease.

Case Description This case report highlights the preoperative workup, surgical approach, and postoperative management of a patient who presents with an aortic pseudoaneurysm and dissection 2 years after the index CABG.

Conclusion The development of an aortic pseudoaneurysm in combination with an ascending aortic dissection after prior coronary artery bypass grafting (CABG) is a rare compilation of complications that has scarcely been reported in the literature.

Keywords
- CABG
- aortic pseudoaneurysm
- aneurysm
- cardiopulmonary bypass

Introduction

Surgical revascularization is performed for patients with significant left main coronary artery disease. The risks associated with coronary artery bypass graft (CABG) surgery are well known with late dissection of the aorta and aortic pseudoaneurysm formation cited separately in various case reports and retrospective reviews; however, there is a paucity of literature on the concurrent presentation of both conditions.[1–3] This case report highlights the preoperative workup, surgical approach, and postoperative management of a patient with both an aortic pseudoaneurysm and dissection 2 years after the index CABG.

Case Report

A 65-year-old male with a history of allergic bronchopulmonary aspergillosis (ABPA) and CABG (left internal mammary artery [LIMA] - left anterior descending artery [LAD], saphenous vein graft [SVG] – obtuse marginal [OM], saphenous vein graft [SVG] – right posterior descending artery [RPDA]) 2 years prior originally presented to an outside hospital with worsening shortness of breath and was found to have a large mid-ascending aortic pseudoaneurysm measuring 78 × 53 × 92mm (►**Fig. 1**). The patient was transferred to our medical center for higher level of care and further workup in the setting of his known history of ABPA. The right coronary artery territory vein graft originated from the pseudoaneurysm sac, whereas the left circumflex artery territory vein graft, native right coronary artery, and native left coronary artery originated from the ascending aorta. Imaging did not reveal periaortic hematoma or active contrast extravasation in the mediastinum or pericardium. Coronary angiography showed patent LIMA-LAD graft with diffuse disease. The SVG to the RPDA was diffusely ectatic and the SVG to the OM had mild luminal irregularities. A preoperative echo demonstrated preserved biventricular function without valvular disease. Infectious disease was consulted

received
April 18, 2023
accepted after revision
July 24, 2023
accepted manuscript online
October 16, 2023

DOI https://doi.org/10.1055/a-2192-5909.
ISSN 2194-7635.

Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

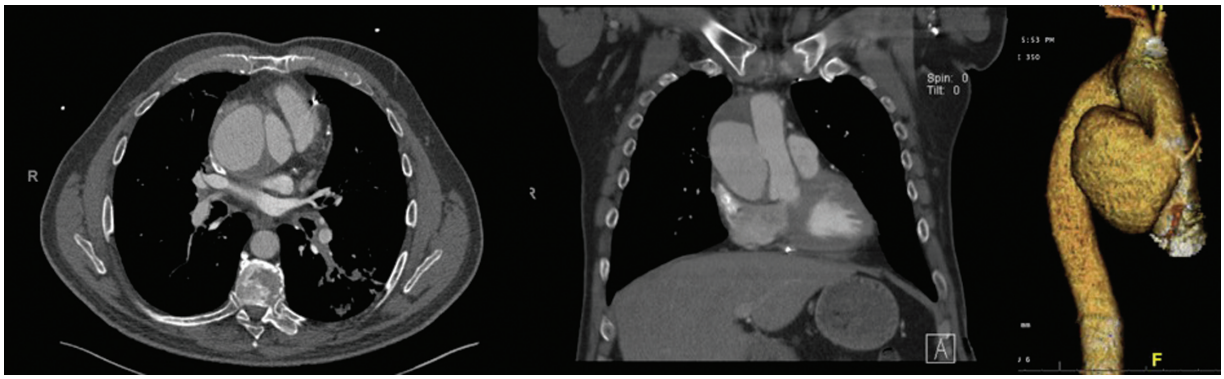

Fig. 1 Preoperative computed tomography with three-dimensional reconstruction demonstrating large pseudoaneurysm at mid-ascending aorta.

preoperatively due to the history of ABPA and did not find any contraindications to proceed with surgery as his ABPA was reported to be well controlled and he was not currently taking any medications for his diagnosis. It should be noted that this diagnosis was made at an outside hospital without histopathological evidence available to corroborate the diagnosis.

Operative notes from the index operation 2 years prior were obtained and were documented a standard median sternotomy approach to expose the heart without any significant ascending aortic atheroma visualized on epiaortic ultrasound, which would prevent safe cannulation or cross-clamping. Thus, the aorta was cannulated through a double purse string suture, an antegrade cardioplegic cannula was introduced into the ascending aorta, and an aortic cross-clamp was placed in the standard fashion.

With the above findings and details from the prior operation, the decision was made to go to the operating room for surgical repair of the large pseudoaneurysm. Peripheral access for cardiopulmonary bypass was established through the right groin and axilla. Upon entering the chest, the large 7 cm ascending aorta pseudoaneurysm with a 2 cm connection to the proximal ascending aorta was discovered, as well as a focal ascending aortic dissection flap at the proximal SVG-OM anastomosis site. The SVGs were liberated as coronary buttons and the pseudoaneurysm was resected and replaced with a 32 mm Hemashield graft (►**Fig. 2**). The venous bypass graft coronary buttons were reimplanted onto the neo-aorta. Intraoperative transesophageal echocardiogram was notable for left ventricular ejection fraction (LVEF) 65% without left ventricular dysfunction or wall motion abnormalities. Cardiopulmonary bypass and cross-clamp time were 328 and 178 minutes, respectively. The patient was transferred to the Cardiothoracic Intensive Care Unit (CTICU) in critical but stable condition and had an uneventful recovery.

Discussion

Ascending aortic dissection after CABG is a rare complication with less than 0.2% incidence.[1] The retrospective study by Eitz et al showed the majority of dissections occurred at the proximal anastomosis (41.7%), supporting the hypothesis that these types of dissections are caused by surgical trauma through manipulation of the aorta.[1] Arterial cannulation, aortic cross clamping, and graft anastomoses can weaken the aorta and disrupt the intima, causing dissections or pseudoaneurysms, as well as inadequate full-thickness bites when performing anastomoses.[2] This includes whether the operation is performed on pump or off pump with various stabilization devices to perform the anastomosis or partial aortic clamping. The initial weakening of the aorta during the operation, in addition to the common comorbidities associated with patients with coronary artery disease, such as hypertension and atherosclerosis, has been hypothesized to contribute to the late development of aortic dissection after CABG.[2]

The dissections can occur intraoperatively or as far out as 10 years after the index operation; however, late dissections are extremely rare and mainly found in case reports.[1,2] A small retrospective review by Dhadwal et al found the mortality associated with the development of a pseudoaneurysm arising from the ascending aorta after prior cardiac surgery was as high as 60% and the average time to pseudoaneurysm repair from index operation was 5 years.[3] Although this was a 10-year retrospective review study, it was underpowered with five total patients contributing to data.[3] A higher powered, more contemporary, study by Lou et al looked at mortality in 365 patients who underwent reoperative aortic arch intervention after previous cardiac surgery and found a 30-day mortality of 13.4%, and long-term follow-up mortality as high as 38%.[4]

Infections also contribute to the formation of pseudoaneurysms as Osler first coined the term mycotic aneurysm in 1885 to describe a pseudoaneurysm with an infectious etiology.[2,3,5] *Aspergillus* is a type of fungus that has been found in ascending aortic pseudoaneurysms in patients after prior cardiac surgery.[6] However, despite our patient's history of ABPA, he was not currently infected with aspergillosis at the time of his redo operation based on his lab tests showing a negative *Aspergillus galactomannan* antigen. It remains unclear whether he had an active infection after his index operation and whether that precipitated the formation of the pseudoaneurysm.

Conclusions

The development of an aortic pseudoaneurysm in combination with an ascending aortic dissection after prior CABG is rare and should be managed with prompt surgical

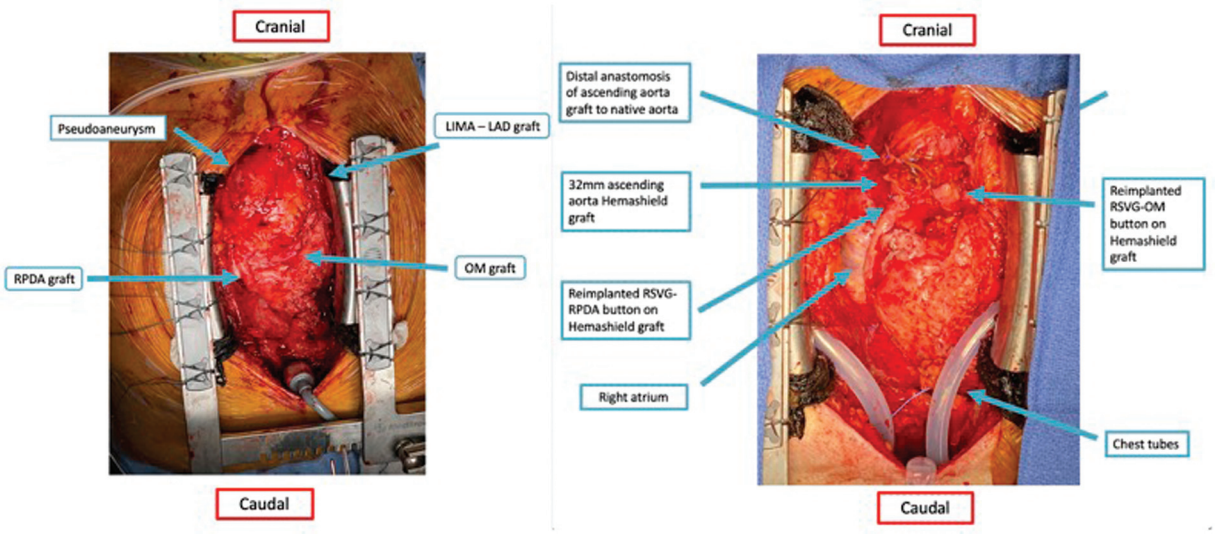

Fig. 2 Pseudoaneurysm with 2 cm connection to proximal ascending aorta.

intervention to prevent the potentially catastrophic consequences of pseudoaneurysm rupture. Providers should also be vigilant for other causes of aneurysms, such as infections, in order to adequately manage concomitant disease processes.

Conflict of Interest

None declared.

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