Rapidly Developing Giant Ascending Aortic Pseudoaneurysm Presenting as Constrictive and Tamponade-like Physiology After Coronary Artery Bypass Grafting: A Case Report

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Abstract
Background: Ascending aortic pseudoaneurysm at a proximal graft anastomosis is an uncommon yet life-threatening complication following coronary artery bypass grafting. Clinical presentation may mimic postoperative cardiac tamponade or constrictive physiology.
Case Presentation: A 55-year-old man presented two weeks after coronary artery bypass grafting with progressive dyspnea, abdominal distension, and bilateral leg edema. Physical examination revealed tachycardia, elevated jugular venous pressure, muffled heart sounds, ascites, and significant peripheral edema. Electrocardiography demonstrated sinus tachycardia with low-voltage QRS complexes, while chest radiography indicated marked cardiomegaly. Urgent transthoracic echocardiography identified a 12 x 15 cm retrosternal cystic lesion anterior to the heart and ascending aorta, with systolic color Doppler flow from the ascending aorta into the cavity. These findings were consistent with a giant pseudoaneurysm resulting from dehiscence of the proximal saphenous vein graft anastomosis to the right coronary artery. Due to severe hemodynamic compromise, emergency reoperation was performed. Cardiopulmonary bypass was established via femoral arterial and venous cannulation prior to sternal re-entry, as the pseudoaneurysm was located immediately beneath the sternum. Surgical exploration confirmed anastomotic dehiscence. The pseudoaneurysm was evacuated and resected, and the graft anastomosis was repaired with direct Prolene suture. The patient recovered without complications.
Conclusion: Giant ascending aortic pseudoaneurysm may develop rapidly following coronary artery bypass grafting and present with right-sided heart failure and constrictive or tamponade-like physiology. Timely echocardiographic assessment and prompt surgical intervention are critical for patient survival.

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Introduction

Ascending aortic pseudoaneurysm represents a rare yet potentially fatal complication after cardiac surgery. It may originate from the aortotomy, cannulation site, or proximal graft anastomosis, and frequently presents with nonspecific compressive or hemodynamic symptoms (1–2). Given the catastrophic consequences of rupture, timely diagnosis is critical.

Coronary artery bypass grafting (CABG) is a primary surgical intervention for multivessel coronary artery disease. As reported by Sullivan and colleagues, ascending aortic pseudoaneurysm is a rare but potentially fatal complication following cardiovascular surgery, particularly after procedures such as aortic valve replacement or CABG.

These lesions are typically linked to technical factors, infection, or compromised tissue integrity. Depending on their size and location, pseudoaneurysms may remain asymptomatic or cause significant local mass effect, with clinical manifestations ranging from mild compressive symptoms to severe complications, including superior vena cava syndrome, right ventricular compression, or fistulization.

We present a case of a giant ascending aortic pseudoaneurysm that developed within two weeks after CABG, manifesting as profound right-sided heart failure with clinical features of constrictive pericarditis and tamponade physiology (3).

Case Presentation

A 55-year-old male with severe triple-vessel coronary artery disease underwent elective coronary artery bypass grafting, which involved the use of the left internal mammary artery to the left anterior descending artery and saphenous vein grafts to the obtuse marginal and right coronary arteries. The immediate postoperative period was uneventful. Two weeks after surgery, the patient presented to the emergency department with rapidly worsening dyspnea, abdominal distension, and bilateral lower extremity edema.

Physical examination revealed tachycardia, significantly elevated jugular venous pressure, muffled heart sounds, a diastolic sound consistent with a pericardial knock, tense ascites, and severe bilateral pitting edema. Electrocardiography demonstrated sinus tachycardia with diffuse low-voltage QRS complexes (Figure 1). Chest radiography showed marked cardiomegaly with a cardiac silhouette suggestive of cardiac tamponade (Figure 2).

Fig 1: Electrocardiogram showing sinus tachycardia with diffuse low-voltage QRS complexes.

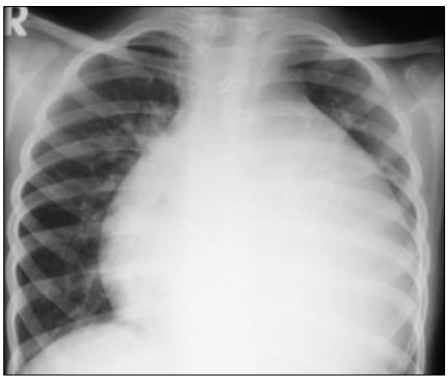

Fig 2: Chest radiograph showing marked cardiomegaly with a tamponade-like cardiac silhouette.

Due to concern for cardiac tamponade or post-surgical constrictive physiology, urgent transthoracic echocardiography was performed. This revealed a massive retrosternal cystic lesion measuring 12 x 15 cm anterior to the heart and ascending aorta, compressing the right-sided cardiac chambers. Color Doppler demonstrated active systolic flow from the anterior wall of the ascending aorta into the cavity (Figure 3). These findings were consistent with an acute leak at the proximal saphenous vein graft anastomosis to the right coronary artery, resulting in a giant pseudoaneurysm. Computed tomography and catheterization were deferred due to the patient's critical condition.

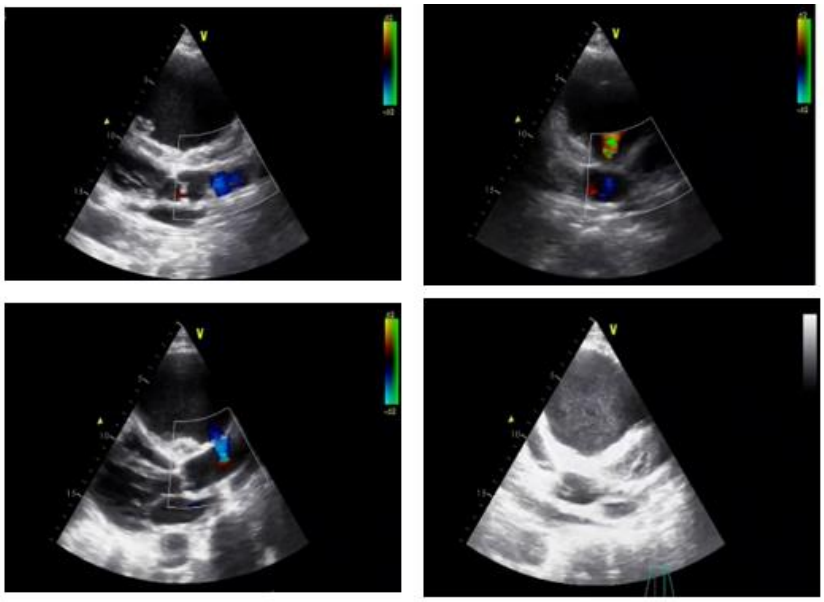

Fig 3: Transthoracic echocardiography demonstrates a giant retrosternal cystic lesion anterior to the ascending aorta. Color Doppler shows systolic communication between the ascending aorta and the pseudoaneurysm cavity

Due to the imminent risk of rupture and severe hemodynamic compromise, emergency reoperation was undertaken. As the pseudoaneurysm was located immediately beneath the sternum, cardiopulmonary bypass was established via femoral arterial and venous cannulation prior to sternal re-entry to minimize the risk of catastrophic hemorrhage.

Surgical re-exploration confirmed a large pseudoaneurysm resulting from dehiscence of the proximal aortic graft anastomosis (Figure 4). The sac was evacuated and resected, and the anastomosis was repaired and reinforced with direct Prolene suture.

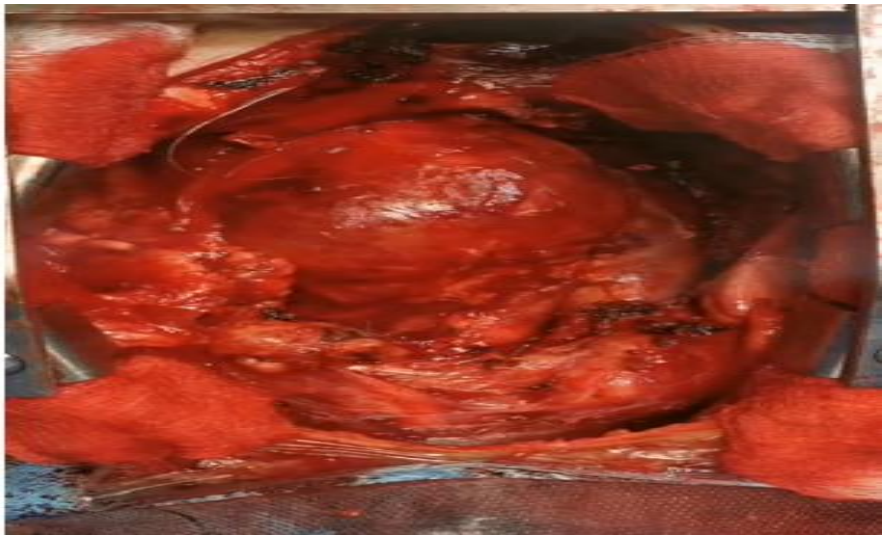

Fig 4: Intraoperative image showing the giant pseudoaneurysm at exploration.

The patient tolerated the procedure well. Postoperatively, dyspnea, ascites, and peripheral edema resolved rapidly. Recovery was uneventful, and the patient was discharged home in stable condition.

Discussion

Postoperative ascending aortic pseudoaneurysm is an uncommon but life-threatening complication. Reported sites include the aortic root cannulation site, and proximal vein graft anastomosis(1.2). Predisposing factors are suture dehiscence, infection, and friable or heavily diseased aortic tissue (2,3). In this case, the lesion most likely resulted from proximal graft anastomotic dehiscence on a markedly atherosclerotic and calcified ascending aorta.

The primary distinguishing feature of this case is the rapid development of a giant pseudoaneurysm within two weeks of coronary artery bypass grafting. The lesion's size and anterior mediastinal location caused significant compression of the right atrium and right ventricle, restricting diastolic filling and mimicking constrictive pericarditis or cardiac tamponade. Elevated jugular venous pressure, ascites, peripheral edema, low-voltage QRS complexes, and muffled heart sounds were consistent with this pathophysiology.

Echocardiography served as the pivotal diagnostic modality in this critically ill patient, rapidly demonstrating both the mass effect and the communication between the ascending aorta and the pseudoaneurysm cavity. Although computed tomography angiography can provide superior anatomical definition, it may not be feasible in unstable patients. Previous reports emphasize the risk of retro sternotomy when the pseudoaneurysm is located directly behind the sternum and highlight the necessity of meticulous operative planning (4.5).

Definitive management is typically surgical. Establishing cardiopulmonary bypass prior to re sternotomy may enhance safety in selected high-risk cases, especially when the pseudoaneurysm is large and immediately retrosternal. In this case, prompt recognition and emergency surgical repair were lifesaving.

Conclusion

Ascending aortic pseudoaneurysm should be considered in patients presenting with acute right-sided heart failure, tamponade-like features, or constrictive physiology following recent coronary artery bypass grafting or cardiac surgery. Urgent echocardiography facilitates rapid diagnosis, and prompt surgical intervention is essential for survival.

Consent

Written informed consent for publication of this case report and the accompanying images was obtained from the patient.

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