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Pulmonary Artery Pseudoaneurysm Secondary to Tuberculosis and its Occlusion using a Vascular Plug (Case Report)

ABSTRACT

Pulmonary artery aneurysms (PAAs) and pseudoaneurysms are rare entities in the spectrum of pulmonary arterial diseases. The etiology of these aneurysms is varied and patients present with nonspecific symptoms which make their diagnosis both difficult and less often considered. In this review, we will discuss the clinical manifestations, etiologies, methods of detection, imaging features, and the current role of endovascular treatment in the management of PAAs.

Key words: Pulmonary artery; aneurysm; pseudoaneurysm

INTRODUCTION

Pulmonary artery pseudoaneurysms (PAPs) are defined as the focal dilatation of a segment of a pulmonary artery. Histologically, a pseudoaneurysm involves only the external layers of the arterial wall (the media and adventitia), while a true aneurysm involves all three layers.[1] PAPs can be congenital or acquired. Causes of congenital PAPs include deficiency of the vessel wall, valvular and post-valvular stenosis and increased flow due to left-to-right shunts. Common causes of acquired PAPs are trauma (often iatrogenic), infection, vasculitis (especially Behçet's disease), and neoplasm.[2] In developing countries like India, tuberculosis (TB) becomes one of the important and most common etiological factors for the development of pulmonary pseudo aneurysm. Rasmussen aneurysm is an inflammatory pseudoaneurysmal dilatation of the pulmonary artery or its branch secondary to TB.[3] Hence, rasmussen aneurysm should be considered as the first differential and early management is to be initiated at the earliest. In this case report, we are presenting a case of rasmussen aneurysm and emphasizing the complications, choice of investigational modalities, and common therapeutic approaches for the management of the pseudoaneurysm.

CASE REPORT

The patient presented with complains of cough and breathlessness for 5–6 days. Multiple episodes of massive hemoptysis were seen (approximately 200 ml per episode and had frequency of 5 times per day). No other comorbidities. No past history of TB.

Imaging findings

- A focal outpouching was noted arising from lateral basal segmental branch of the right lower lobar artery. A near complete lumen occluding thrombotic plug (causing approximately 80–90% narrowing) was seen at its origin
- Few focal areas of ground-glass opacities were seen in superior and posterior basal segments of bilateral lower lobes
- Few enlarged partially necrotic lymph nodes were noted in paratracheal and paraesophageal regions
- Incidentally noted aberrant origin of the right subclavian artery, arising from the arch of aorta and coursing posterior to the esophagus.

Differential diagnosis

- Rasmussen aneurysm
- Mycotic aneurysm
- Small vessel vasculitis
- Cavitatory lesion with fungal ball.

DISCUSSION

PAP is life-threatening conditions which have the tendency to rupture with resultant massive hemoptysis. Many pulmonary vascular diseases are easily diagnosed using multidetector computed tomography with valuable information regarding

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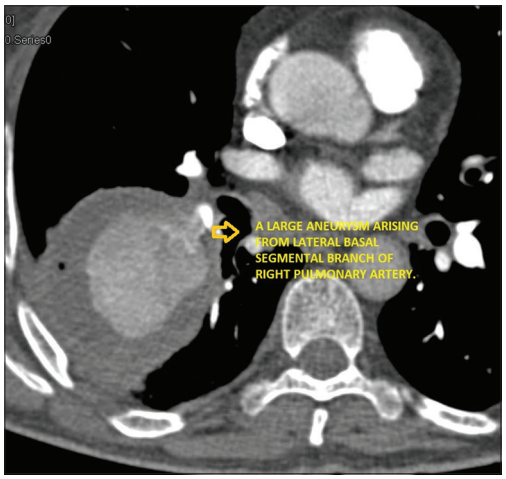

Figure 1: A large type A pseudoaneurysm arising from lateral basal segmental branch of the right pulmonary artery [5]

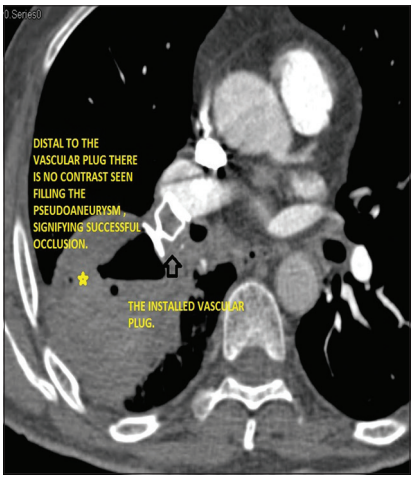

Figure 4: Post-intervention computed tomography pulmonary angiography showing complete occlusion of the pseudoaneurysm with no distal opacification by the contrast

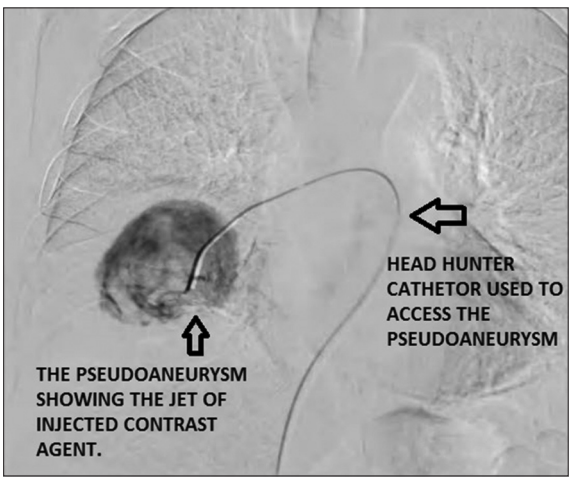

Figure 2: On catheter angiography, a large pseudoaneurysm was noted arising from main trunk of descending pulmonary artery

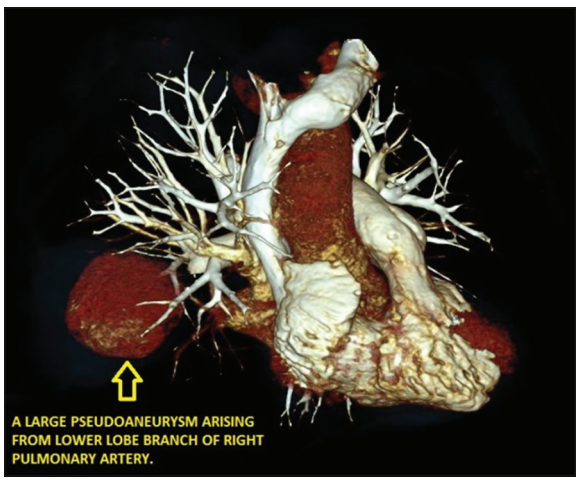

Figure 5: Volume rendering technique reconstruction demonstrating a large pseudoaneurysm arising from lower lobe of the right pulmonary artery

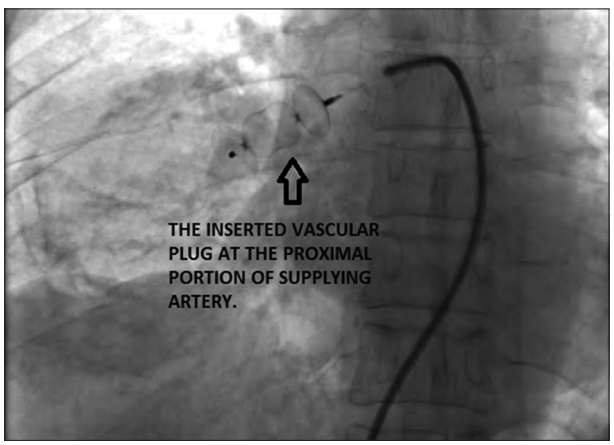

Figure 3: Vascular plug was deployed at the origin of the supplying artery

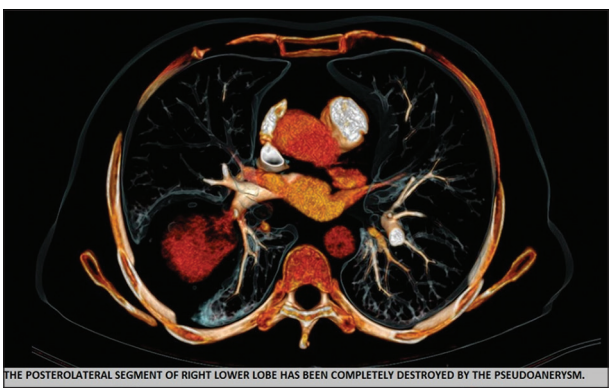

Figure 6: Volume rendering technique reconstruction image showing completely destroyed posterolateral branch of the right lower lobe

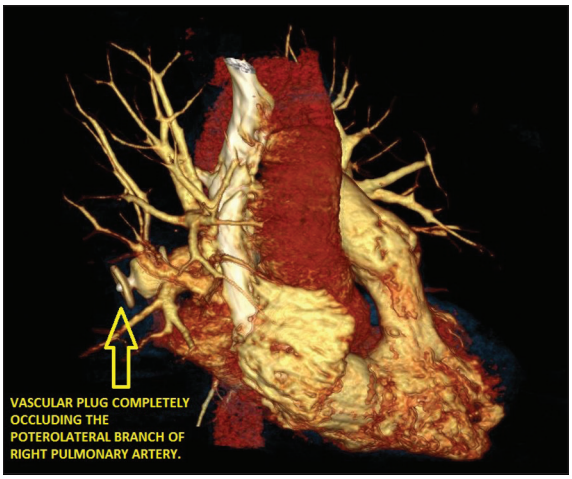

Figure 7: Volume rendering technique reconstruction image showing a vascular plug completely occluding the lower lobe pulmonary branch

its anatomy.[2] Early diagnosis of the condition and early intervention can be live saving for the patient as they have higher tendency to rupture and cause massive hemoptysis. There are two options of management either surgical resection of the affected lobe or endovascular embolization. Patients with massive hemoptysis are poor candidates for surgical resection.[4]

PAPs are classified into four types depending on the blood supply from bronchial, pulmonary, and non-bronchial pulmonary collaterals arteries. Type A PAPs have a patent pulmonary artery without bronchopulmonary shunting. Type B PAPs have a bronchopulmonary shunt with resultant stenosis or reversed flow within the feeding pulmonary arteries. Type C PAPs have supply mainly from bronchial and non-bronchial systemic collaterals with non-visualization of the feeding pulmonary artery. Type D PAPs were diagnosed only at pulmonary angiography. Type D PAPs have the same occlusion of the feeding pulmonary artery as type C PAPs; they have slow filling systemic arterial collaterals that are only visualized in pulmonary angiography and cannot be detected at catheter angiography.[5]

Type A and type B PAPs are treated by embolizing the feeding pulmonary artery and bronchial and non-bronchial systemic collateral arteries. For Type C and Type D PAPs, embolization of bronchial and non-bronchial systemic collateral arteries is performed to decrease systemic arterial flow to the PAPs.[5]

CONCLUSION

In this case of type A PAP (rasmussen aneurysm), the feeding branch of pulmonary artery was occluded using a vascular plug with successful extrusion of the pseudoaneurysm from the pulmonary circulation.

Early diagnosis and intervention of the pseudoaneurysm proved to be helpful to the patient, the use of vascular plug proved to be efficient as compared to the use of coil or a graft. Following the procedure, the patient did not have any episode of hemoptysis. The occlusion of the PAP is challenging with requirement of cath laboratory for successful occlusion of the pulmonary pseudoaneurysm.

Rasmussen aneurysm and mycotic aneurysms are close differentials and cannot be differentiated on imaging as both the conditions present in a similar pattern. Sputum culture and sensitivity are very helpful in deciding the etiology and further medical management. In this case, sputum culture report was positive for TB and AKT drugs were started for the patient following intervention.

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