Journal of
Lung Diseases and Pulmonary Medicine

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Case Report Open Access

Bilateral Peripheral Pulmonary Artery Aneurysm Following Pulmonary Tuberculosis in a 32-Year Old Man

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Received Date: March 23, 2026 **Accepted Date:** March 31, 2026 **Published Date:** April 03, 2026

Citation: Sagne J.M, Akpo L.G, Diop M.S, Diop M, Diallo M.C, et al. (2026) Bilateral Peripheral Pulmonary Artery Aneurysm Following Pulmonary Tuberculosis in a 32-Year Old Man. J Lung Dis Pulm Med 2: 1-6

Abstract

Introduction: Pulmonary artery aneurysm (PAA) is a rare condition accounting for less than 1% of intrathoracic aneurysms [1,2]. We report the case of a bilateral peripheral pulmonary artery aneurysm in a 32-year-old man following a history of pulmonary tuberculosis.

Case Report: A 32-year-old man, a construction worker and active smoker (25 pack-years) who has been smoke free for 10 months. He was treated for and declared cured of pulmonary tuberculosis in December 2024. He was referred to us 3 months after the end of his treatment for exertional dyspnea that had been progressively worsening for 4 months (NYHA Class II) and a persistent deterioration in his general condition. On physical examination, he presented with poor general condition and a BMI of 14 kg/m², anteromedial chest dullness, and a SpO_2 of 95% at rest. Cardiac auscultation was normal, with no peripheral signs of heart failure. A chest CT angiography confirmed the presence of a bilateral aneurysmal mass in the lobar branches, measuring 64 × 56 mm on the right and 45 × 42 mm on the left, associated with a 9-mm halo; there were no signs of pulmonary embolism, active pulmonary tuberculosis, or emphysema. The echocardiogram was normal. He had no abnormal profile of nonspecific inflammatory markers. Serological tests for retroviruses and syphilis were negative. ANCA levels were normal. Computed tomography angiography of the lower extremities and aorta was unremarkable. The patient was referred to the thoracic surgery department for further management. Surgery was deemed risky, and regular follow-up was recommended.

Conclusion: Tuberculosis is one of the infectious causes and remains the most likely hypothesis in our patient. The morphological appearance and bilateral involvement are distinctive features of our case.

Keywords: Pulmonary Artery Aneurysm, Tuberculosis. Intrathoracic Aneurysms; Pulmonary Tuberculosis; Angiography

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Introduction

Pulmonary artery aneurysms (PAA) are a rare condition, accounting for less than 1% of intrathoracic aneurysms [3,4]. Their etiology is varied, including congenital, infectious, inflammatory, traumatic, and idiopathic causes. Among infectious causes, pulmonary tuberculosis holds a special place, particularly in so-called Rasmussen aneurysms, which result from erosion of the arterial wall upon contact with a tuberculous cavity [5,6]. Although classically described as solitary, localized lesions associated with active or sequelae of cavitary tuberculosis, certain atypical forms have been reported. These unusual presentations pose diagnostic and therapeutic challenges, particularly in the absence of specific clinical signs. We report here a rare case of bilateral aneurysms of the peripheral branches of the pulmonary arteries occurring in a young patient following recovery from pulmonary tuberculosis, illustrating an atypical presentation both morphologically and temporally.

Case Report

A 32-year-old construction worker and current smoker (25 pack-years) who has not smoked for 10 months. He has no history of heart disease, surgery, or chest trauma. He was treated and declared cured of pulmonary tuberculosis at a suburban health clinic in December 2024, with a positive GenXpert test sensitive to rifampicin. He received initial four-drug therapy (2 months: Isoniazid, Rifampicin, Pyrazinamide, Ethambutol) followed by a maintenance phase (4 months: Isoniazid, Rifampicin), with smear-negative results after the intensive phase. He presented to our department three months after completing his treatment due to a persistent deterioration in his general condition, without fever. He reported exertional dyspnea that had progressively worsened to NYHA Class II over the past four months, along with a marked improvement in his cough, and no chest pain. Physical examination revealed poor general condition (BMI = 14 kg/m^2), anteromedial chest dullness, and an oxygen saturation (SpO2) of 95% on room air. Cardiac auscultation was normal, with no peripheral signs of heart failure. The chest X-ray showed a homogeneous opacity with a longest axis of 6 cm in the right paracardial region, roughly rounded in shape, with an inner margin not blending with the mediastinum, as well as a homogeneous, rounded opacity in the left parahilar region, with a longest axis of 3 cm and showing signs of hilar convergence. Thoracic computed tomography angiography revealed a bilateral aneurysmal mass in the lobar branches, measuring 64 × 56 mm, associated with a 9-mm halo on the right and a 45 × 42-mm halo on the left; there were no signs of pulmonary embolism, active pulmonary tuberculosis, or emphysema (Figures 2 and 3).

Figure 1: Two rounded, homogeneous opacities: a right paracardiac opacity measuring ~6 cm (long axis) and a left parahilar opacity measuring approximately 3 cm

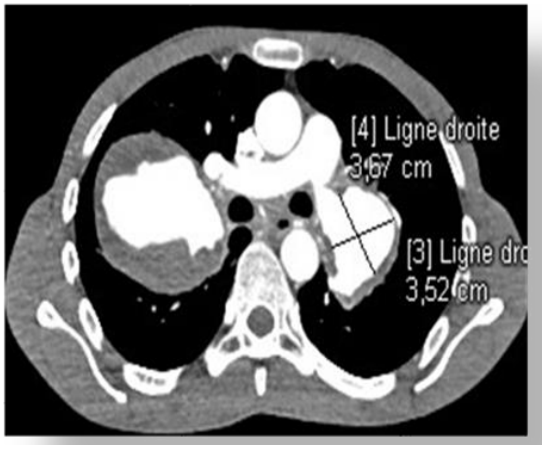

Figure 2: Mediastinal view of the chest CT angiogram: bilateral aneurysmal mass in the lobar branches, measuring 64 × 56 mm, associated with a halo measuring 9 mm on the right and 45 × 42 mm on the left

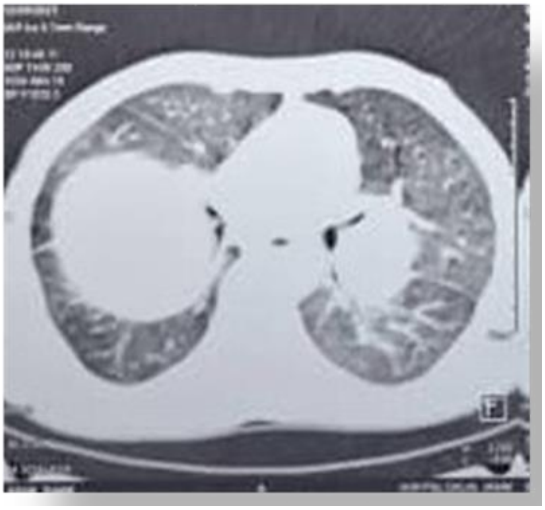

Figure 3: Parenchymal window of the chest CT scan showing no residual lesions or progression of tuberculosis

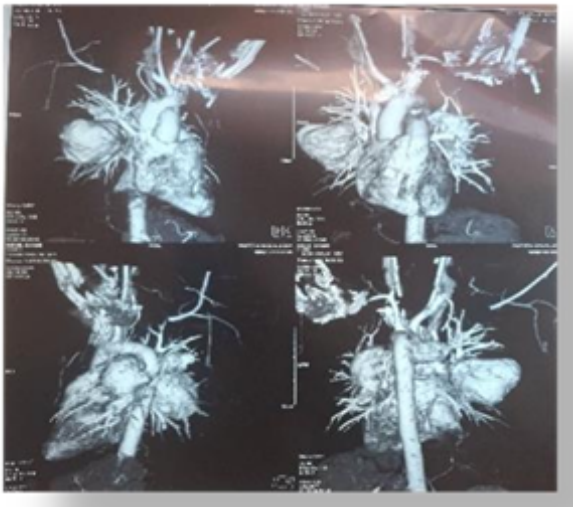

Figure 4: CT angiogram of the aorta and lower extremities showing no other aneurysms

Laboratory tests revealed no signs of a non-specific inflammatory syndrome. Serological tests for retroviruses and syphilis were negative. ANCA levels were normal. Echocardiography was normal, with no signs of pulmonary hypertension or heart disease. Computed tomography angiography of the lower extremities and aorta revealed no other aneurysms.

The patient was referred to the thoracic surgery department for further management. Surgery was deemed too risky given the resources available on site, and regular follow-up was recommended. The family was informed of the prognosis and the risk of death in the event of aneurysm rupture. His clinical condition has remained stable over the past six months.

Discussion

Several schools of thought propose definitions of pulmonary artery aneurysm (PAA). One defines it as a ratio of the diameter of the pulmonary artery trunk to that of the ascending aorta greater than 2 [7], and another as a diameter of the pulmonary artery trunk greater than 40 mm [8,9]. Pulmonary artery aneurysms, whether they affect the main trunk or one of its branches, are very rare [10]. PAA can be classified as proximal (or central) PAA and peripheral PAA. Proximal PAA is defined by a diameter greater than 4 cm at the level of the pulmonary trunk. Peripheral PAA includes aneurysms located in the intrapulmonary arteries [11]. In this young patient, who was recently declared cured (December 2024) and presented with large bilateral pericardial masses (64 × 56 mm on the right, 45 × 42 mm on the left), several points warrant discussion. Tuberculous-origin AAPs are most commonly described as Rasmussen aneurysms, which are generally solitary, localized, and associated with active or sequelae-related tuberculous cavities. In the series by Sbano et al. [5], peripheral pseudo aneurysms were predominantly unilateral and closely associated with adjacent parenchymal lesions. In our case, several features deviate from these classic descriptions. First, the involvement is bilateral, which remains exceptional. The majority of cases reported in the literature describe unilateral involvement, even in complicated forms [5,12]. Furthermore, the absence of a visible tuberculosis cavity on imaging suggests a pathophysiological mechanism different from that of classic Rasmussen aneurysms. The time to onset, following microbiological cure of tuberculosis, is also a distinctive feature. While the majority of cases occur in the context of active tuberculosis, some observations suggest that persistent weakening of the arterial wall, linked to chronic inflammatory changes, could explain late-onset forms [12,13]. The mechanism of aneurysm formation lies in the destruction of vascular wall tissues and their replacement by granulomatous tissue, leading to thickening and weakening of the arterial wall from the outside in [10]. Post-infectious vasculitis could be considered, although immunological testing remained negative in our case. Differential diagnoses include, in particular, Behçet's disease and systemic vasculitides. Behçet's disease is a well-known cause of multiple pulmonary aneurysms, but it was ruled out in the absence of suggestive clinical signs [14]. Similarly, ANCA-associated vasculitides appear unlikely given normal immunological test results. A normal echocardiogram rules out significant pulmonary hypertension of cardiac origin. In nearly 50% of cases, the cause is congenital heart disease leading to pulmonary arterial hypertension [9]. Clinically, PAAs may remain asymptomatic for a long time or present with massive hemoptysis, a potentially fatal complication. In our case, the absence of hemoptysis despite the large size of the aneurysms, particularly on the right (64 mm), is not reassuring; aneurysms of this size carry a high risk of acute hemorrhage. In the literature, peripheral aneurysms are often diagnosed during hemorrhagic episodes [6]. A chest CT angiogram is the gold standard for diagnosis, providing an accurate assessment of the aneurysm's morphology, location, and associated complications [12,13]. Management guidelines for pulmonary artery aneurysms are not standardized due to their rarity. Treatment options include surgery, endovascular techniques (embolization), or surveillance. Surgery remains the treatment of choice in the absence of contraindications, to prevent rupture or dissection [14]. Interventional approaches are generally preferred in cases of hemoptysis or high risk of rupture [6,13]. However, in certain situations, particularly in cases of high surgical risk or bilateral involvement, a conservative strategy with close monitoring may be adopted [4,16], as in our case.

Conclusion

This case illustrates an unusual form of bilateral

pulmonary aneurysms occurring after treated tuberculosis, highlighting the need for prolonged monitoring of patients, even after apparent cure. It also highlights the diagnostic and therapeutic challenges posed by this rare condition.

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