






Case Report

Pseudoaneurysm as an Etiological Cause of Hemoptysis in Extensive Tuberculosis

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Abstract

Hemoptysis is a life-threatening emergency and a possible first sign of pulmonary tuberculosis. Minor hemoptysis, as a possible clinical aspect of adult tuberculosis, usually has limited course and in most cases, is resolved with antitubercular therapy. However, massive hemoptysis is a life-threatening condition associated with a mortality rate of >50% in the absence of well-timed and proper handling. Hence, prompt diagnosis and early interventions are essential. In this study, we present a rare case of pseudoaneurysm causing massive hemoptysis in a patient with pulmonary tuberculosis.

KEYWORDS: Pseudoaneurysm, tuberculosis, hemoptysis

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INTRODUCTION

Tuberculosis is still a major threat to public health in the world.¹ It represents diagnostic and therapeutic challenges as it can present numerous forms of complications that may involve the lung parenchyma, airways, pleura, or pulmonary vessels.¹ Cavitation, bronchiectasis, and pleural disease are the most seen and described complications that are opposite to the vascular complications which are rare sequelae of pulmonary tuberculosis. However, the latter has a very high mortality rate.¹

Pseudoaneurysm is a rarity caused by the weakening of the pulmonary artery wall from adjacent cavitory tuberculosis. Progressive weakening of the arterial wall occurs as granulation tissue replaces both the adventitia and the media. The granulation tissue in the vessel wall is then gradually replaced by fibrin, resulting in thinning of the arterial wall, pseudoaneurysm formation, and subsequent rupture.

The aim of this study is to emphasize the importance of early identification of pseudoaneurysm as a cause of potentially life-threatening bleeding in pulmonary tuberculosis.

CASE PRESENTATION

A 51-year-old male, a salesman by profession, a long-term smoker, with a history of diabetes mellitus, gastritis, and severe sideropenic anemia, was hospitalized due to serious conditions, massive hemoptysis and acute respiratory failure.

He complained of a productive cough that lasted for months with severe hemoptysis that had occurred 7 days before hospitalization. Additionally, he reported recent night sweats, progressive fatigue, shortness of breath, and weight loss.

The physical examination showed dyspnea at rest and diffuse auscultatory wet rales but stable vital signs. In the initial laboratory investigation, we find microcytic anemia, leukocytosis, elevated C-reactive protein, hypokalemia, hyponatremia, and hypoalbuminemia. The classic chest x-ray showed inhomogeneous shading of the upper lung lobe on the right with a large round soft tissue shadow of 7.7 cm in diameter located in the middle lung lobe on the right with bilateral spotted infiltrates (Figure 1). Written informed consent was obtained from the patient for publication of his medical data, including images.

The patient underwent flexible bronchoscopy as an initial procedure to investigate massive hemoptysis because it has potential diagnostic as well as therapeutic benefits. But the procedure was interrupted before bronchoscopic sampling was even started because of the intolerance of the patient.

Upon stabilization of the patient, we performed a computed tomography (CT) scan which showed a completely morphologically altered upper lung lobe to the right with wide bronchial spaces and volume reduction and destruction.

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Figure 1. Inhomogeneous shading of the upper lung lobe on the right with a large round soft tissue shadow of 7.7 cm in diameter located in the middle lung lobe on the right with bilateral spotted infiltrates.

Diffuse bilateral varicose and cylindrical bronchiectasis of markedly thickened bronchial walls with mucoid impacts were also shown. Furthermore, it showed a large consolidation in the anterior segment of the lower lung lobe on the right and within the consolidation foci of destruction with pseudoaneurysm sizes of 23 and 26 mm. Lymphadenopathy of the mediastinum and a lower group of paratracheal and subcarinal lymph nodes were also described (Figure 2).

Acid-resistant bacilli were recorded in the sputum by direct microscopy, with a subsequent positive culture for *Mycobacterium tuberculosis*. The QuantiFERON test was negative. The patient was diagnosed to have extensive pulmonary tuberculosis with pseudoaneurysm within the inflammatory consolidation of the right lower lobe.

Conservative treatment of hemoptysis was performed due to the stable vital signs of patient. It included strict bed rest, cough suppressant, tranexamic acid, and blood transfusion. Further, we started the first-line antituberculous therapy (isoniazid, rifampin, ethambutol, pyrazinamide, and streptomycin). *The patient's clinical condition gradually improved, and there was no need for bronchial artery embolization (BAE) or urgent surgical procedures.*

MAIN POINTS

- Tuberculosis is still a major threat to public health in the world, and hence, it requires prompt diagnosis and an early treatment plan.
- Pseudoaneurysm could be a cause of life-threatening bleeding in pulmonary tuberculosis
- Comprehensive awareness and knowledge of atypical tuberculosis manifestations as well as extremely rare tuberculosis-related pulmonary vascular complications are crucial.

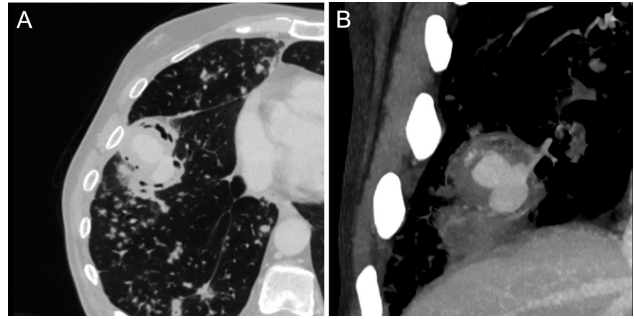


Figure 2. Consolidation in the anterior segment of the lower lung lobe on the right and within the consolidation foci of destruction with pseudoaneurysm sizes of 23 and 26 mm.

A control chest x-ray performed after 3 weeks showed that the infiltrate of the anterior segment of the lower right lobe is in the partial regression and the infiltrate of the right apical is stationary with a smaller amount of gas inclusion (Figure 3). Also, control CT pulmonary angiography after 3 weeks showed complete regression of the previously described pseudoaneurysm as well as *partial regression of the consolidation* (Figure 4). *The patient's follow-up period was 2 years.*

DISCUSSION

Hemoptysis in the presence of tuberculosis can be due to varied etiopathologies like bronchiectasis, aspergillomas, bronchiolitis, scar carcinoma, chronic bronchitis, microbial colonization within a cavity, and vascular abnormalities such as pseudoaneurysms.

The infection has been associated with pseudoaneurysms in the systemic circulation but is seen less commonly in the pulmonary circulation. We need to mention that there are also a few non-infectious as well as iatrogenic cases that could possibly be associated with pseudoaneurysm formation.²

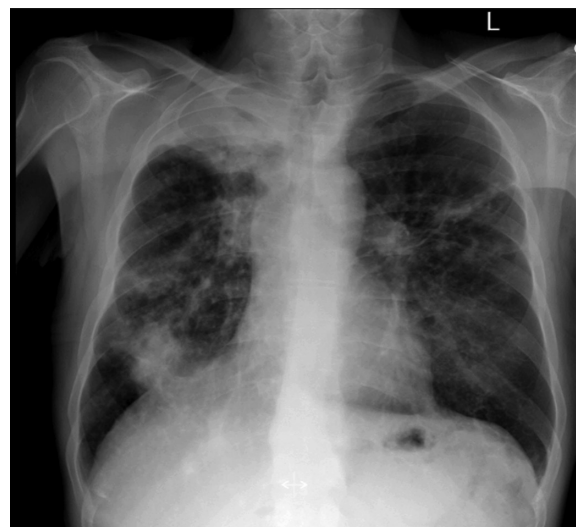


Figure 3. Infiltrate of the anterior segment of the lower right lobe is in the partial regression and the infiltrate of the right apical is stationary size with a smaller amount of gas inclusion.

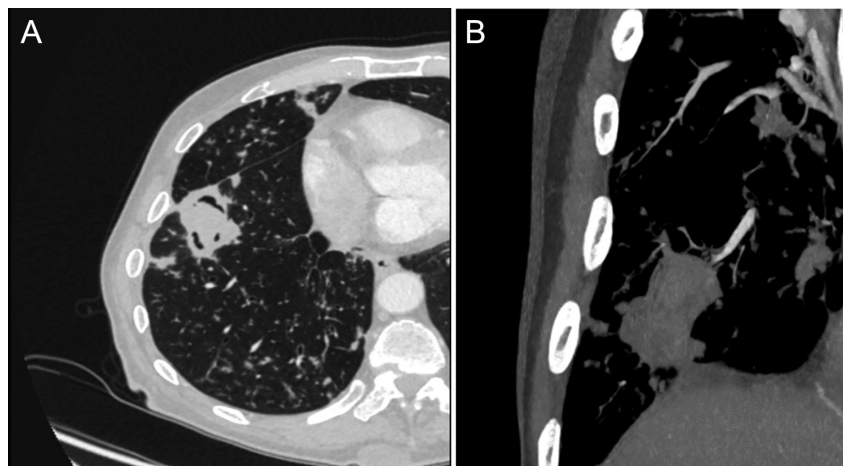


Figure 4. Complete regression of the previously described pseudoaneurysm in the consolidation of the anterior segment of the lower lobe to the right, which is regressive in size.

In our case, pseudoaneurysm was a very rare complication of pulmonary tuberculosis. These pseudoaneurysms, which were first described in 1868 by Fritz Valdemar Rasmussen, can originate in the bronchial vasculature (most frequently, in up to 90% of cases), non-bronchial systemic arteries, or pulmonary artery branches.³

Aneurysmal dilatation of the pulmonary artery adjacent to the cavity (Rasmussen's pseudoaneurysm) is one of these vascular complications which are estimated to occur in 0.25% of patients with pulmonary tuberculosis. It usually presents clinically by massive hemoptysis thus carrying an extremely high mortality rate that exceeds 38%.⁴

The pulmonary artery pseudoaneurysm associated with tuberculosis is thought to be caused by contiguous spread from the tuberculous cavity, which leads to tissue destruction from the outer vessel wall toward the lumen. The affected vessel wall is prone to break down, leading to rupture and pseudoaneurysm formation.⁵ Computed tomography angiography is the preferred diagnostic modality for pulmonary artery pseudoaneurysm. In the literature, the prevalence of pulmonary artery pseudoaneurysm ranges from 5% to 11% in patients with tuberculosis presenting with hemoptysis.⁶

Since hemoptysis is a life-threatening condition, early intervention with diagnostic and therapy plans in patients with respiratory or hemodynamic compromise not responding to the conservative treatment is mandatory. The treatment of choice is BAE or if it is further required surgery, either urgent or planned – delayed, which mainly depends on the patients' clinical status. The risk of mortality in patients who underwent urgent surgery was higher versus planned-delayed surgery; therefore, it is impelling to accomplish preoperative optimization.⁷

Previous similar case presentations have revealed that the treatment of choice was BAE with only 1 case report in which surgery was conducted.⁸⁻¹¹

Comprehensive knowledge of atypical tuberculosis manifestations as well as extremely rare tuberculosis-related pulmonary vascular complication is crucial since early

antituberculosis treatment introduction could contribute to conservative treatment of hemoptysis.

Informed Consent: Written informed consent was obtained from the patient.

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