

# Rasmussen's Aneurysm: A Rare Cause of Massive Hemoptysis in Pulmonary Tuberculosis

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## Abstract

## Case Report

Rasmussen's aneurysm is a rare cause of hemoptysis in patients with tuberculosis. It is an under-recognised vascular complication of active pulmonary tuberculosis, with a mortality rate of over 50%. It is secondary to an aneurysmal dilatation of the pulmonary artery adjacent to tuberculous cavity. Thoracic CT angiography is the gold standard for making a positive diagnosis and precisising the hemorrhagic site, with a mapping of the pulmonary artery damage. Rupture of the artery can cause massive hemoptysis, which can sometimes be devastating. It is important to remember that hemoptysis persists despite successful bronchial artery embolisation in all patients with tuberculosis.

**Keywords:** Pulmonary tuberculosis, hemoptysis, Rasmussen's aneurysm.

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## INTRODUCTION

Pulmonary tuberculosis or pulmonary TB is still a public health problem in developing countries. Its resurgence in developed countries is linked to a number of factors, including HIV infection.

Minor hemoptysis in pulmonary TB is often spontaneous and controlled by anti-bacillary treatment, but massive hemoptysis is often of systemic arterial origin requiring urgent intervention. Rasmussen's aneurysm is a little-known cause of hemoptysis in patients with tuberculosis [1]. It is an inflammatory dilatation of a pulmonary arterial branch adjacent to a tuberculous cavity, associated with 5% of these cavitary lesions and whose rupture can be the cause of fulminant hemoptysis [2].

We report the case of a tuberculosis patient undergoing treatment who was admitted for massive hemoptysis, highlighting the importance of recognising this vascular complication, which affects 0.25% of tuberculosis patients [3].

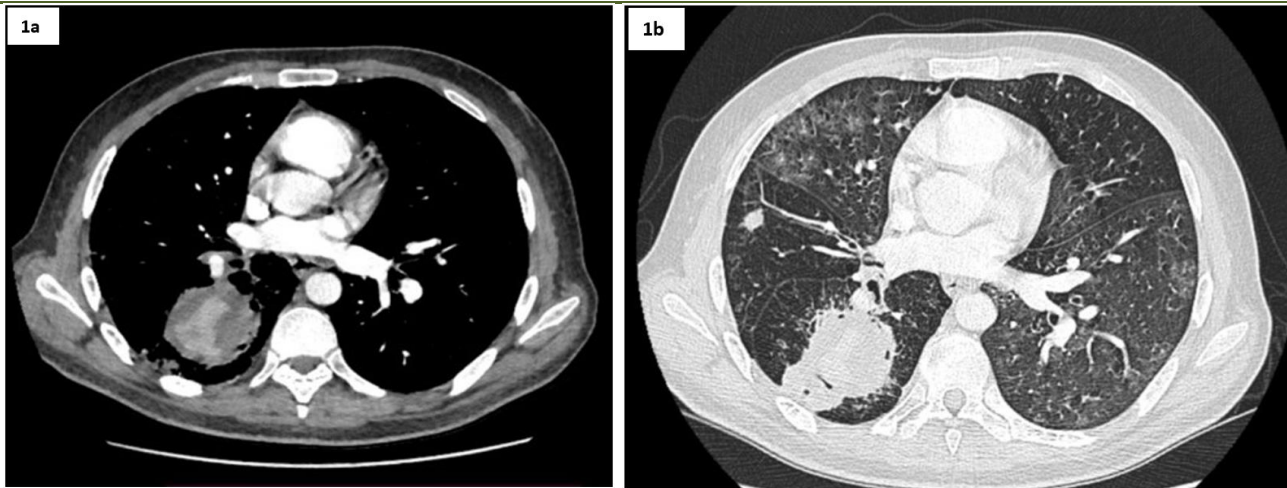
## OBSERVATION

The patient was 56 years old and had been treated for one month for pulmonary TB, confirmed by

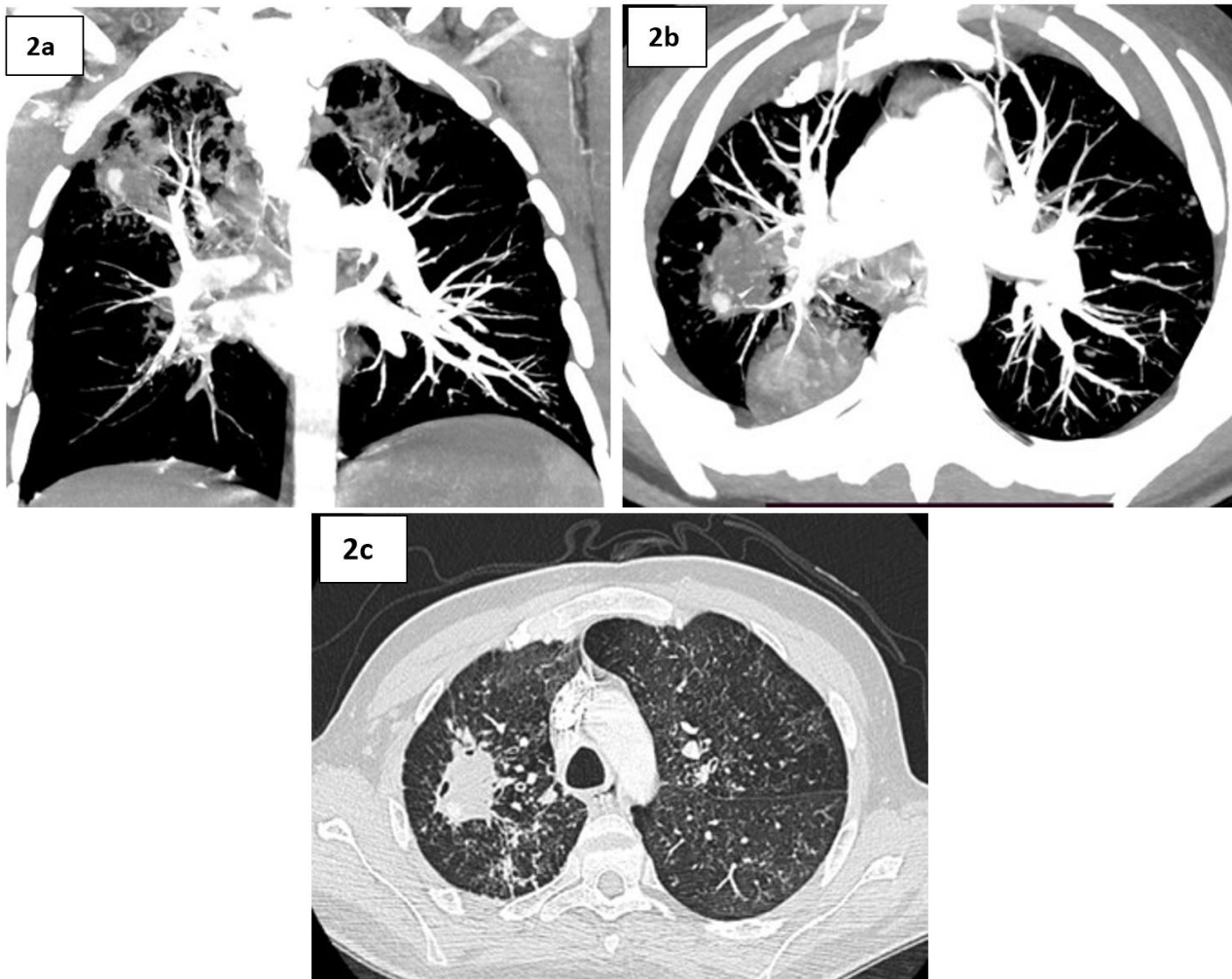
quantiferon assay and positive Koch's bacilli in sputum, and was on anti-bacillary therapy. He presented to the emergency department with episodes of hemoptysis complicated by anemia, for which he received a transfusion. In view of this clinical picture, a thoracic CT angiography was ordered, showing:

- Extravasation of the contrast product in the right Fowler's artery, surrounded by an excavated consolidation with reticular infiltrate all around and foci of alveolar hemorrhage (fig.1).
- Aneurysmal dilatation of a sub-segmental pulmonary arterial branch of the dorsal segment of the right upper lobe measuring 10x8 mm, adjacent to a tuberculous cavity (fig.2)
- Multiple micronodules and nodules, some of which are excavated, some with centro-lobular distribution, relative to the pulmonary parenchymal involvement of pulmonary TB (fig.3).

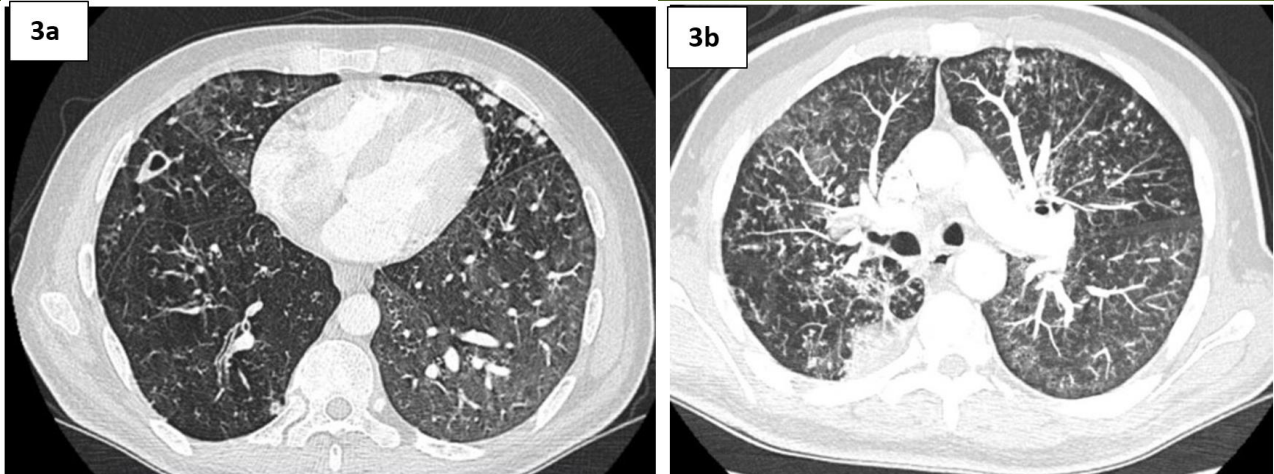
Given this radio-clinical context, the diagnosis of a Rasmussen's aneurysm complicated by rupture was suggested. The patient was referred to another hospital for management and scheduled for embolisation.



**Figure 1: Axial thoracic CT angiography, mediastinal window (after injection of PDC) and lung window, showing extravasation of the contrast product in the right Fowler (1a), surrounded by excavated consolidation (1b), also associated with ground-glass lesions associated with alveolar hemorrhage**



**Figure 2: Thoracic CT angiography showing aneurysmal dilatation of a sub-segmental pulmonary arterial branch of the dorsal segment of the right upper lobe in coronal (2a) and axial (2b) sections, adjacent to a tuberculous cavity (2c)**



**Figure 3: Chest CT scan in axial section, lung window showing a nodular infiltrate, some of which are excavated in the middle lobar and lingular regions (3a) and micronodular with centrilobular distribution (3b)**

## DISCUSSION

Massive hemoptysis in pulmonary TB may reveal a number of complications, such as bronchial dilatation, aspergilloma, chronic bronchitis, carcinoma or vascular complications. The latter are often of systemic bronchial arterial origin. Pulmonary artery origin has been reported in less than 10% of hemoptysis cases [1-4].

Rasmussen's aneurysm is a dilatation, often peripheral, of a branch of the pulmonary artery adjacent to a tuberculous cavity, secondary to chronic inflammation affecting the adventitia and media, replaced by granulation tissue and then fibrin, at the origin of these aneurysms. The persistence of these inflammatory phenomena leads to their rupture in tuberculous cavities, manifested by massive hemoptysis [4, 5].

Determining and locating the origin of hemoptysis is important in guiding the therapeutic approach. This cannot be done clinically, which is why imaging is essential. Thoracic CT angiography, a non-invasive technique, is the main way for making a precise diagnosis: locating the hemorrhagic site and determining its origin (bronchial artery or pulmonary artery).

In their retrospective study, Khalil *et al.*, highlighted the importance of this imaging technique in the therapeutic approach to hemoptysis of pulmonary artery origin [1].

This examination should be performed primarily in the event of recurrence of hemoptysis after successful bronchial artery embolisation, giving rise to suspicion of a Rasmussen aneurysm. In one study, 38% of patients with persistent hemoptysis despite bronchial artery embolisation had a Rasmussen's aneurysm, so it is important to be aware of this [5].

Endovascular treatment by embolisation is the best technique, but the risk of rupture during embolisation is not negligible and requires a good command of the therapeutic technique.

Surgical treatment is reserved for cases refractory to endovascular treatment [3].

## CONCLUSION

Rasmussen's aneurysm is an often-unrecognized cause of hemoptysis in tuberculosis patients. The diagnosis is based on thoracic CT angiography, which reveals an aneurysmal dilatation of the pulmonary artery adjacent to the tuberculous cavity. It is important to be aware of this when hemoptysis is refractory to bronchial arterial embolisation. The major risk is its rupture, which can be the cause of massive hemoptysis.

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