



Case report

Rasmussen's aneurysm: A forgotten scourge[☆]Kshitij Chatterjee^a, Brendon Colaco^{a, b}, Clinton Colaco^{a, b}, Michael Hellman^c,
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ABSTRACT

Rasmussen's aneurysm is an inflammatory pseudo-aneurysmal dilatation of a branch of pulmonary artery adjacent to a tuberculous cavity. Life threatening massive hemoptysis from the rupture of a Rasmussen's aneurysm is an uncommon yet life threatening complication of cavitary tuberculosis (TB). We present a case of a young woman who presented with low-grade fever and hemoptysis. Computed tomographic (CT) angiography showed biapical cavitary lesions and actively bleeding aneurysms involving pulmonary artery, which successfully underwent glue embolization.

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1. Introduction

Pulmonary tuberculosis has a significantly lower incidence in the developed world compared to the developing world. Classically, TB has been associated with poverty and malnutrition. In developed countries, factors such as drug or alcohol abuse, HIV infection, immigration, and treatment modalities like tumor necrosis factor (TNF) alpha inhibitors are predominant risk factors for tuberculosis [1]. Minor hemoptysis in the setting of pulmonary TB is often self-limited and controlled with anti-tubercular therapy (ATT); however, life threatening hemoptysis in pulmonary TB is usually arterial in origin and requires urgent intervention [2]. Rasmussen's aneurysm is an inflammatory pseudo-aneurysmal dilatation of a branch of a pulmonary artery (PA) adjacent to a tubercular cavity. It is reported to be associated with 5% of such cavitary lesions and can rupture leading to massive hemoptysis and death [3]. We present a case of a patient with a ruptured Rasmussen's aneurysm presenting as massive hemoptysis requiring urgent pulmonary artery embolization. We highlight the importance of prompt recognition of Rasmussen's aneurysm, choice of investigational modalities, and common therapeutic approaches.

2. Case presentation

A 35-year-old African American woman presented with a three-week history of intermittent low-grade fever, progressive dyspnea, and hemoptysis (approximately 30–40 ml/day). She reported no weight loss or sick contacts. She had two negative TB skin tests in the last two years prior to presentation, as an employee of the corrections department. She had been working in a business office setting for the year prior to the hospital visit. A chest x-ray two years prior to the presentation for pre-operative evaluation for a fibroid surgery was essentially normal. There were mild hilar calcifications which were thought to be associated with old histoplasmosis. (Fig. 1a) Chest x-ray during the current admission revealed bilateral upper lobe opacities (Fig. 1b). Her Human-Immunodeficiency Virus (HIV) test was negative and quantitative immunoglobulin levels were normal. She denied using intravenous drugs. The amount of hemoptysis was concerning and thus she had a flexible bronchoscopy (FB) which identified blood trickling from the left upper lobe into the left main-stem bronchus. Computed tomographic angiography (CTA) was done which showed biapical cavitary lesions with infiltrates and pulmonary artery aneurysms (Fig. 2 a, b and c). Her hemoptysis rapidly worsened, and she was emergently intubated and taken to the interventional radiology where a pulmonary angiogram confirmed three left upper lobe aneurysms, two of which were actively bleeding (Fig. 3a and b demonstrate one of the aneurysms). She underwent emergent glue embolization of all three aneurysms (Fig. 4). She remained stable

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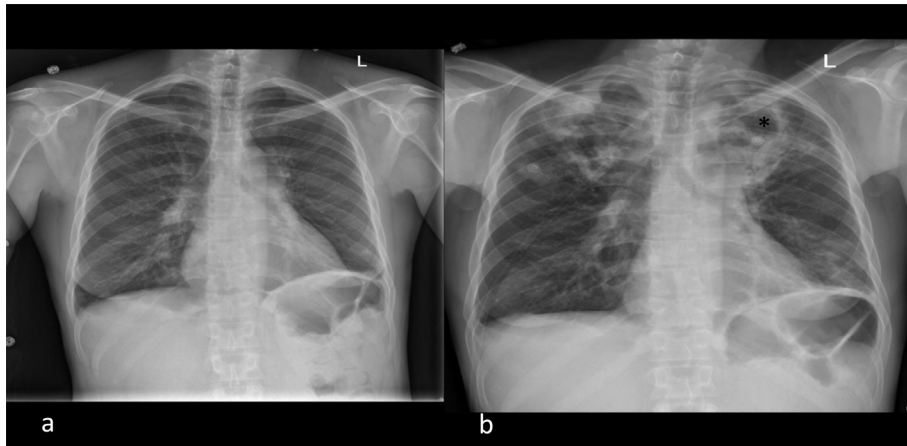


Fig. 1. (a) Chest x-ray demonstrating calcification in the hilum, (b) large biapical cavities, left larger than right.

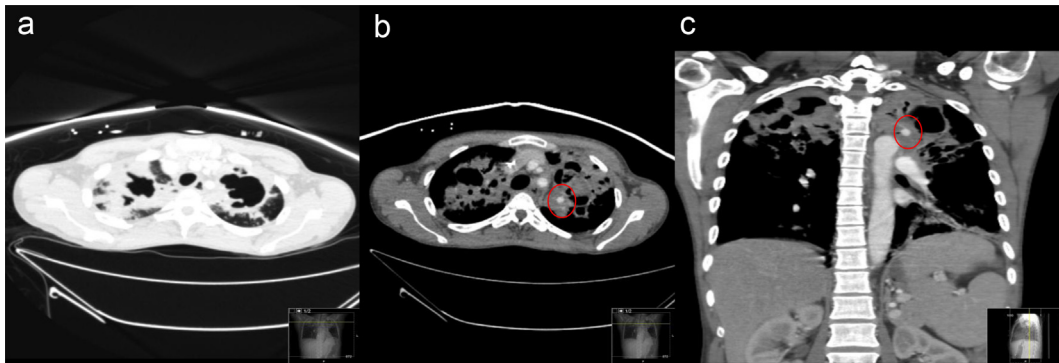


Fig. 2. (a) CT axial view demonstrating thick cavitary lesions in the both upper lobes. (b) CTA axial views demonstrating a contrast filled aneurysm in the left upper lobe (c) CTA sagittal view demonstrating with left upper lobe aneurysm.

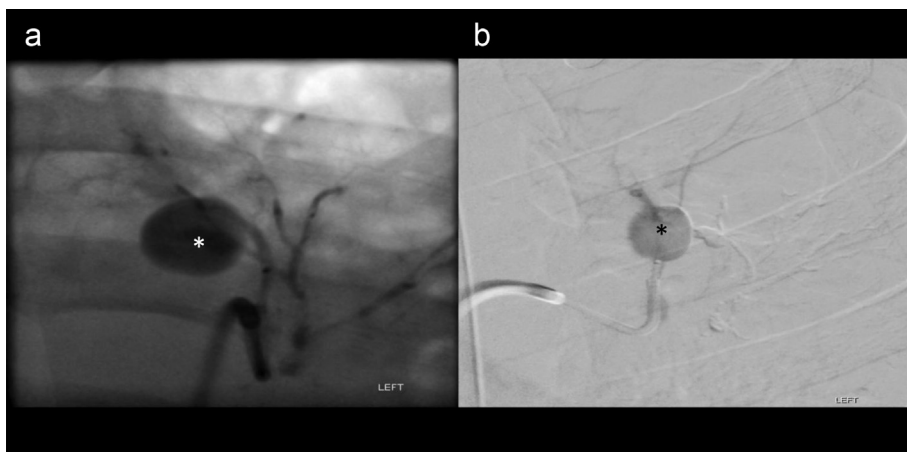


Fig. 3. (a) Bronchial angiogram demonstrating a large aneurysm (b) digital angiography of the same aneurysm.

post-procedure without further hemoptysis. Sputum and bronchoalveolar lavage (BAL) specimens were smear positive for Acid-Fast Bacilli (AFB) and grew *Mycobacterium tuberculosis* complex that was sensitive to all first line anti tuberculosis drugs. Patient was treated for tuberculosis and has now completed her course of ATT with no further episodes of hemoptysis.

After the diagnosis, the contact investigations by the health

department, found 8 more patients with active infection at her office, which was the business office of a dance club.

3. Discussion

Pulmonary tuberculosis presents with a variety of symptoms, which are usually insidious in onset and progression. Symptoms

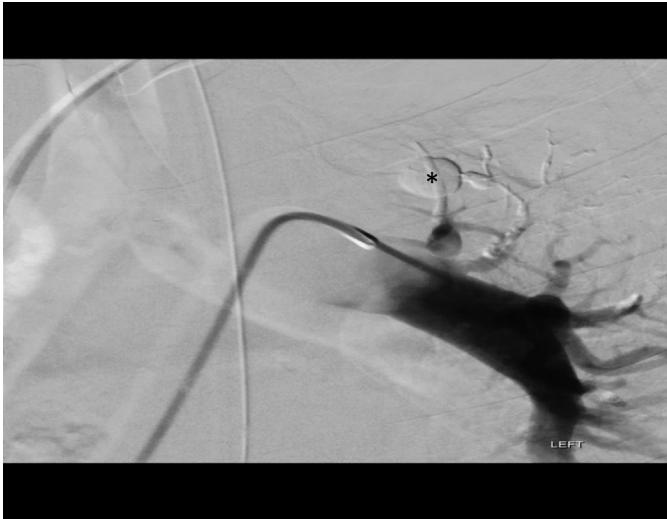


Fig. 4. Digital subtraction angiography demonstrating a non filling aneurysm. After glue injection.

such as low-grade fever, night sweats, cough, and mild hemoptysis usually persist for weeks before patients seek healthcare. Massive hemoptysis, which has a high mortality rate up to 50%, is one of the presenting features that require urgent intervention [4,5]. Massive hemoptysis in TB can be the presentation of multiple underlying pathologies like bronchiectasis, aspergilloma, broncholiths, or vascular complications [2,6]. Of the vascular complications underlying massive hemoptysis in TB, bronchial arteries (BA) are the most common source and pulmonary artery (PA) account for <10% of hemoptysis [3,6]. BA also have higher pressures than the pulmonary circulation making the bleeding from these arteries more difficult to control. Rasmussen's aneurysm is an important entity that requires urgent recognition and distinction from BA bleeding. It is a pseudo-aneurysmal dilatation of a branch of pulmonary artery secondary to chronic inflammation in a contiguous tuberculous cavity. The reported incidence of such pathology is around 5% in cavitary tuberculosis [2,3]. Prior to the widespread use of CT scan, a commonly used approach was to perform systemic/bronchial artery embolization and proceed to pulmonary artery embolization if the former was ineffective [7]. The advent of multidetector row CT angiography (MDCTA) has led to early localization of the source of bleeding [8]. Khalil et al. highlighted the effectiveness of MDCTA in guiding therapy for hemoptysis of pulmonary artery origin with a retrospective clinical and radiological analysis [9]. For our patient, CTA and bronchoscopy in concert correctly identified the location of the aneurysms, facilitating early appropriate intervention. Arterial trans-catheter embolization is the first line of management for massive hemoptysis originating from either bronchial or

pulmonary circulation. Studies have been conducted evaluating various methods for embolization including glue embolization, coil packaging, and use of a stent-graft though limited data exists comparing these methods to each other, with no clear advantage of one over the other [10]. We used glue for embolization as the patient was exsanguinating, in order to achieve rapid occlusion.

4. Conclusion

Life threatening massive hemoptysis can arise from a pseudo-aneurysm of pulmonary artery or its branches contiguous to a tuberculous cavity. Such pathology, also known as Rasmussen's aneurysm can be differentiated from a bronchial or systemic source of bleeding by an urgent MDCTA, which localizes the lesion and guides therapy. Emergency endovascular management techniques like arterial trans-catheter embolization are the preferred therapeutic modality for massive hemoptysis arising from a Rasmussen's aneurysm.

Conflicts of interest

The author's have none.

Disclosures

The author's have none.

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