



Case report

The forgotten bomb: Ramussens's aneurysm

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ABSTRACT

Introduction: Rasmussen's aneurysm is an inflammatory pseudoaneurysmal dilatation of a branch of the pulmonary artery adjacent to the tuberculous cavity. It often presents with hemoptysis resulting from its rupture. Massive hemoptysis seen in giant aneurysms is a rare but life-threatening complication of cavitary tuberculosis.

Aim: In this case, we aimed to present a case of giant rasmussen aneurysm that did not bleed and was diagnosed incidentally.

Case study: In this article, we present a female patient who was surprisingly diagnosed with Rasmussen's aneurysm during her follow-up after having been admitted to our emergency department due to diabetic ketoacidosis, fever, and shortness of breath and not responding to tuberculosis treatment. She was diagnosed using multi-detector computed tomography angiography and underwent embolization with a percutaneous thrombin injection. On the day after the procedure, thoracotomy had to be performed because the pseudoaneurysm continued to show contrast enhancement on imaging. She was successfully treated with surgery.

Results and discussion: Although pulmonary artery aneurysms are rare, it should be kept in mind that they may be related to tuberculosis. Pulmonary artery aneurysms are large asymptomatic and can reach gigantic dimensions as in this case. Rupture of an aneurysm of this size can be predicted to be mortal. Percutaneous thrombin injection can be used for treatment. However, percutaneous treatment may recur in large aneurysms, in which case surgical treatment is curative.

Conclusions: Rasmussen aneurysm is very rare, and when it is asymptomatic, its diagnosis may be delayed until it reaches gigantic dimensions. Contrast-enhanced thorax computed tomography and especially multi-detector computed tomography angiography are helpful in diagnosis.

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1. INTRODUCTION

Pulmonary tuberculosis presents with various symptoms, which usually have an insidious onset, progress and result in severe manifestations when complicated.^{1,2} The typical symptoms of tuberculosis include productive cough, hemoptysis, weight loss, fatigue, malaise, fever, and night sweats.² Rasmussen aneurysm is very rare and is usually asymptomatic. It is usually asymptomatic and usually diagnosed by the symptoms of tuberculosis. The most mortal complication is rupture of aneurysm.³ Multi-detector computed tomography angiography (MDCTA) is a useful non-invasive imaging modality for the initial assessment of hemoptysis. The aim of the initial diagnostic evaluation should be to determine the localization, source, and significance of the aneurysm.^{4,5} MDCTA plays an important role in determining the size of the source of the aneurysm, predicting the possibility of rupture and determining the treatment option.

2. AIM

In this case, we aimed to present the diagnosis and treatment features of a giant rasmussen aneurysm without bleeding and diagnosed incidentally.

3. CASE STUDY

A 16-year-old girl with a diagnosis of type 1 diabetes mellitus (DM) presented to the emergency department with the complaints of fatigue, fever, and shortness of breath. Posterior–anterior (PA) chest X-ray was performed due to the patient's elevated infection parameters (sedimentation, CRP, leukocytes), who was in a diabetic ketoacidosis state at the time of admission and presented with rales/rhonchi. The patient was detected to have suspicious radiopacity and reticular densities in the left lung on PA chest X-ray, and therefore thoracic computed tomography (CT) was acquired. CT showed consolidated areas and the tree-in-bud pattern in the lower lobe of the left lung, which was evaluated to be consistent with tuberculosis reactivation. However, the patient did not respond to tuberculosis treatment. At the end of the third treatment month, a non-contrast CT examination of the thorax was undertaken, which revealed secondary cavitory areas (Figure 1). Then, thoracic CT angiography was performed with the administration of intravenous contrast medium and a 9-cm diameter pseudoaneurysm associated with the left pulmonary artery was detected (Figure 2).

A percutaneous thrombin injection was administered as treatment. The pseudoaneurysm did not show contrast enhancement on the digital subtraction angiography (DSA) images taken during the thrombin injection (Figure 3). However, as the pseudoaneurysm continued to show contrast enhancement in the imaging performed the following day, with the consent of the patient and her parents, surgical treatment was planned.

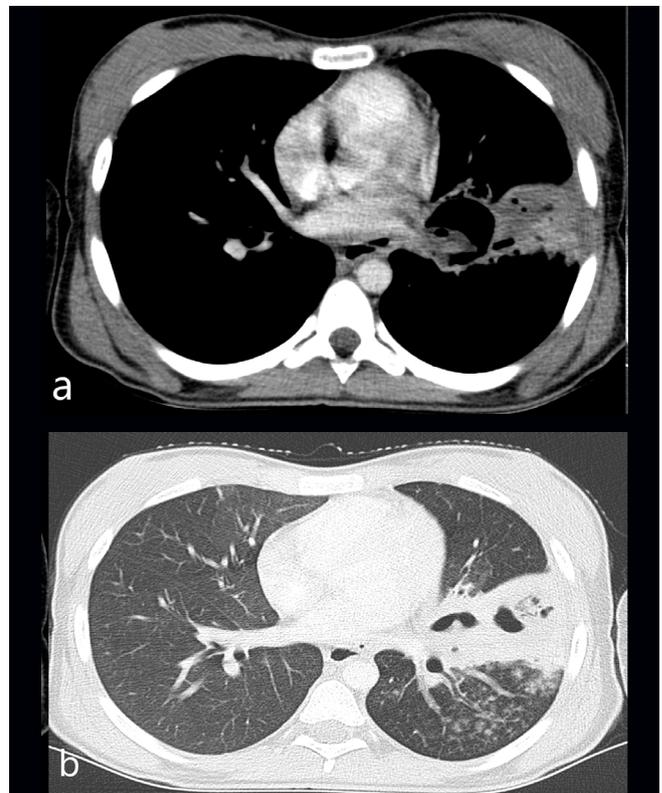


Figure 1. In the contrast-enhanced thorax CT mediastinum (a) and parenchyma (b) window; consolidation and cavitary lesion in the left lung are seen. There appears to be no enhancement in the cavity in the arterial phase, but the consolidation is enhanced.

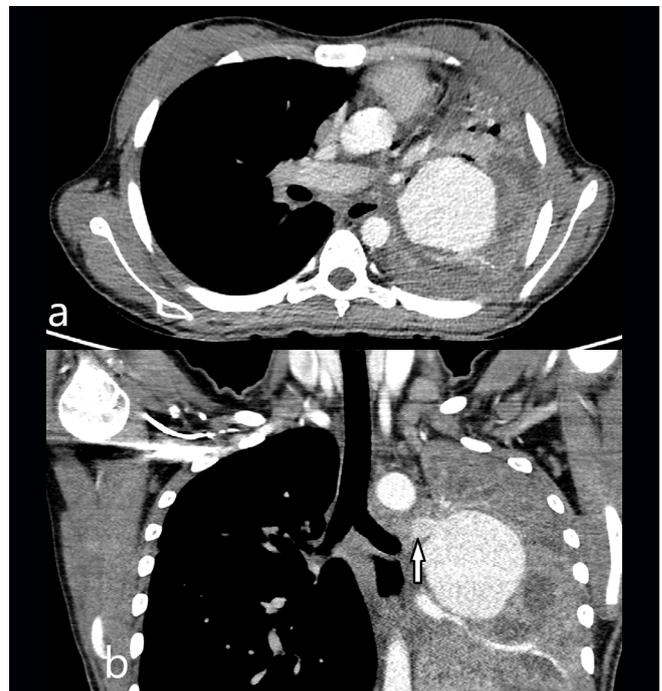


Figure 2. In the axial image on MDCTA examination, the aneurysm is filled with contrast (a); The connection between the pulmonary artery and the aneurysm is clearly seen in the coronal reformat images (marked with arrow) (b).

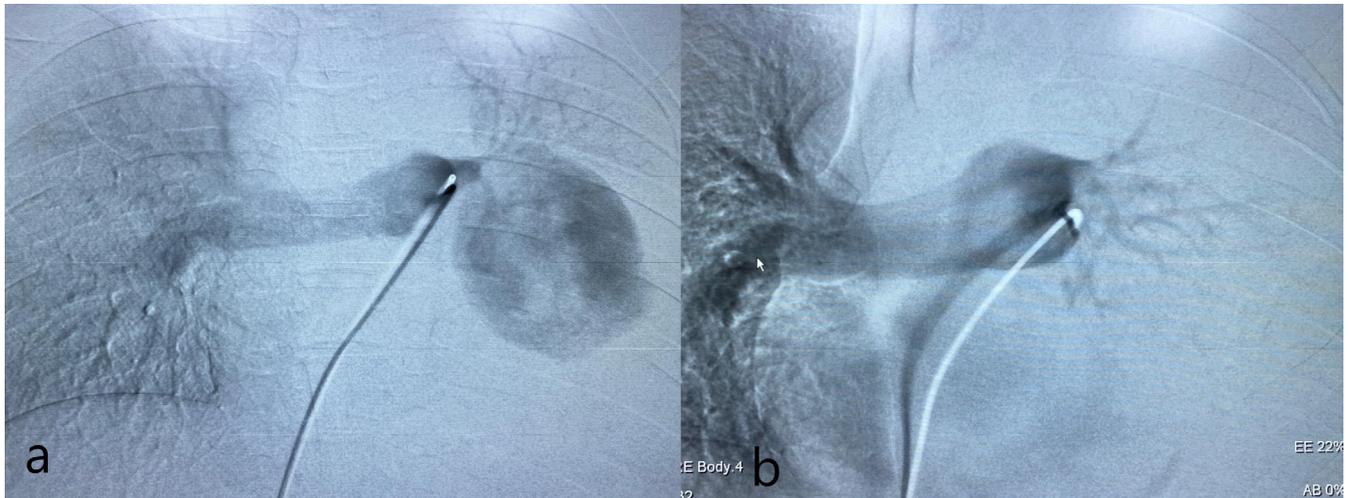


Figure 3. In DSA examination, it is seen that the pulmonary artery was catheterized and the aneurysm was filled with contrast material with the contrast material given (a). After percutaneous thrombin injection, the aneurysm appears to be thrombosed and the aneurysm is not enhanced (b).

4. DISCUSSION

Aneurysms secondary to tuberculosis often originate from the segmental pulmonary arteries. Tuberculosis infiltrates the adventitia and media layer of the segmental artery adjacent to granulation tissue.^{6,7} Over time, fibrin replaces granulation tissue, leading to the thinning of the vessel wall, followed by the formation of an aneurysm, and eventually rupture and hemoptysis.⁸ Autopsy studies have shown that 5% of cases with chronic cavitary tuberculosis have Rasmussen's aneurysm.^{9,10}

Minor hemoptysis can sometimes occur in cases of pulmonary tuberculosis, but it is mostly self-limited and subsides with anti-tuberculosis treatment.¹¹ However, the rupture of large-sized aneurysms, as observed in the current patient, has a mortality risk of up to 80%, and therefore treatment is essential when diagnosed.¹²

Massive hemoptysis in tuberculosis may be the result of various underlying pathologies, such as bronchiectasis, aspergilloma, broncholiths, and vascular complications. In tuberculosis, vascular complications often originate from the bronchial arteries, and the pulmonary artery accounts for less than 10% of hemoptysis cases. The introduction of the MDCTA has greatly facilitated the localization of the source of the aneurysm, quantification of its size, detection of thrombosis, and mapping of the anatomy of other vascular structures originating from the aneurysm.¹³ The combined use of thin-section axial scans and reformatted images provides a clear visualization of aneurysmatic arteries, which are sources of bleeding and may require embolization.^{6,14}

Since the patient was young and less complication rates were reported in the literature, endovascular treatments were considered primarily. In the treatment of Rasmussen's aneurysm, successful results have been obtained with an immediate percutaneous thrombin or N-butyl cyanoacrylate glue injection, angiographic coil embolization, vascular plug, stent-graft use, or combined treatment.^{6,13,14} However, in the literature, there are no case series showing the supe-

riority of these methods over each other. Endovascular N-butyl cyanoacrylate glue embolization from the pulmonary artery was considered for the treatment of the patient. However, this was abandoned due to the lack of stabilization of the catheter and the concern of the possibility of glue reflux. Due to the localization of the aneurysm and the patient's young age and unwillingness to use anticoagulants for life, graft stenting was abandoned. Due to the inability to reach the appropriate vascular plug in our hospital and in the region, this treatment method could not be used either.

In the current patient, only a thrombin injection was administered, and the thrombosis procedure was unsuccessful probably due to the large size of the pseudoaneurysm. As in this case, thoracotomy may be considered as the last-choice treatment in cases where endovascular treatments are insufficient or hemoptysis recurs.

5. CONCLUSIONS

A pulmonary artery aneurysm, also known as Rasmussen's aneurysm, can be distinguished from a bronchial or systemic source of bleeding with MDCTA, which helps localize the lesion and guides treatment. Techniques such as percutaneous and endovascular embolization may be the first treatment choice in the presence of Rasmussen's aneurysm. In recurrent cases, surgery can be undertaken as a definitive solution.

Conflict of interest

The authors declare that they have no conflict of interest.

Funding

This study has no funding.

Ethics

This study was carried out in accordance with the provisions of the Declaration of Helsinki and the Good Clinical Practice guidelines. Since the study was retrospective and conducted with radiological images of the patient, informed consent was not obtained.

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