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Case Report

Rasmussen aneurysm: A forgotten complication of tuberculosis in the COVID-19 era

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ABSTRACT

COVID-19 pandemic has led to an overwhelming healthcare system causing a delay in management of other infectious diseases such as tuberculosis. Rasmussen aneurysm (RA) appears in chronic cavitary tuberculosis. We report here, three cases of pulmonary tuberculosis complicated by RA admitted to Department 1 of Abderrahmane Mami hospital in Tunisia. Data were collected from June 2020 to September 2021. All patients presented with hemoptysis. Sputum was positive for the acid-fast bacilli. Computed tomographic pulmonary angiography showed RA. Only one patient underwent emergent glue embolization. These cases give an insight into the importance of timely therapeutic care for tuberculosis.

1. Introduction

Pulmonary tuberculosis (PT) can present with a large variety of symptoms. Fever, night sweats, cough, and hemoptysis are the most common. Life-threatening hemoptysis in pulmonary TB is usually arterial in origin and requires urgent intervention [1]. Invasive cavitation of parenchyma with involvement of the pulmonary vasculature is a phenomenon known as Rasmussen aneurysm (RA). It can rupture leading to massive hemoptysis and death [1].

We describe three cases of pulmonary tuberculosis complicated by RA treated in 2020 and 2021.

2. Case 1

A 32-year-old man, with no comorbidities, presented with a six months history of fever, night sweats, productive cough, and multiple episodes of hemoptysis. No weight loss or asthenia was reported. On presentation, he had a fever of 38°. A complete blood count (CBC) showed a hemoglobin level of 11.2 g/dl. Liver and renal functions were normal. Chest X-ray revealed large left cavitation. During the current hospitalization, he experienced an episode of non-massive hemoptysis; a blood loss of less than 100 mL/day. On the physical exam, his blood pressure was normal (TA = 110/80), and he had no dyspnea. On CBC there was no hemoglobin fall (Hemoglobin = 11g/dl). He underwent a computed tomographic pulmonary angiography (CTPA) urgently. It showed multiple cavitary consolidations of the two upper lobes and the left lower lobe. Three of these cavities were in direct contact with the segmentary branch of the pulmonary artery creating RA (Fig. 1). Sputum was positive for the acid-fast bacilli. In this case, we decided not to perform embolization as hemoptysis was minor. The patient was treated with first-line antitubercular drugs with no further episodes of hemoptysis. Clinical, bacteriological, and radiological improvements were noticed after six months of treatment.

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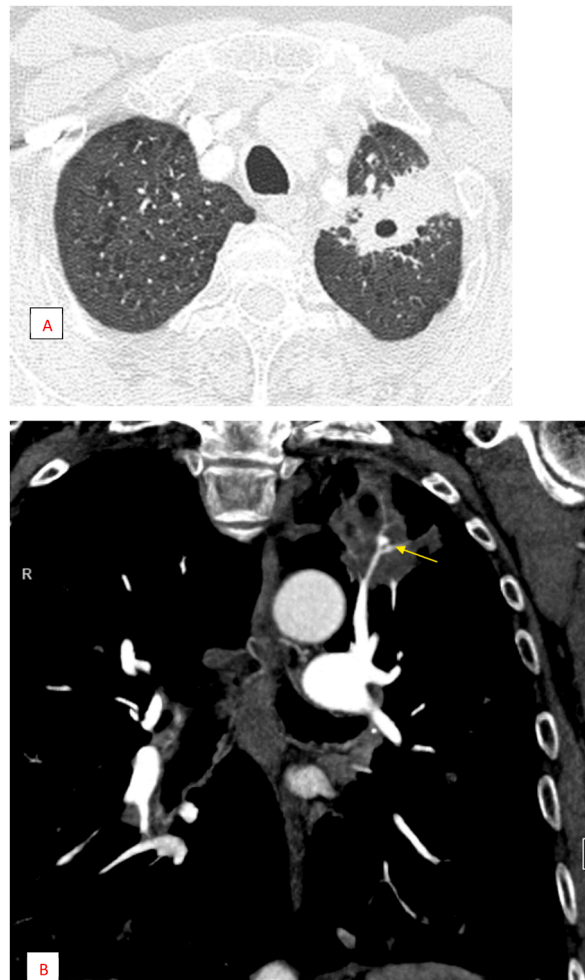


Fig. 1. Case 1
 A. sagittal lung window showing condensation excavated from the apical segment of the left upper lobe
 B. Post contrast CT thorax showing addition image at the expense of an apical sub-segmental artery of the culmen.

3. Case 2

A 46-year-old smoker patient, with a medical record of pulmonary tuberculosis successfully treated in 2018, complained of dry cough and chest pain four months before his presentation to our department. He was admitted with positive acid-fast bacilli in sputum. CBC showed anemia (hemoglobin = 9.4g/dl). He tested negative for COVID-19. Two days later, he presented with massive hemoptysis; blood loss of more than 250ml. Physical exam showed tachycardia (pulsation = 120bpm) and hypotension (blood pressure = 80/50). Laboratory investigation detected hemoglobin fall (Hb = 8g/dl). He was rapidly transferred to the intensive care unit where he was transfused. He received catecholamine and intravenous hemostatic agents. CTPA confirmed a left lower lobe aneurysm (Fig. 2). He underwent emergent glue embolization of the aneurysm and remained stable without further hemoptysis. He was treated successfully with antituberculosis drugs for six months. He had no further episodes of hemoptysis.

4. Case 3

A 50-year-old male patient with a long history of asthma and bilateral bronchiectasis with chronic respiratory failure, was discharged with oxygen supplementation and non-invasive ventilation. He was admitted to our department for an acute exacerbation of his asthma, apart from a fever evolving for six months. He had many episodes of minor hemoptysis leading to the suspicion of pulmonary embolism (PE). CBC showed anemia (hemoglobin = 9g/dl). He tested negative for COVID-19. CTPA excluded the presence of PE and showed a large cavity in the left upper lobe in direct contact with a 4mm RA. Sputum was positive for the acid-fast bacilli, as well as the culture for TB mycobacteria. There were no arguments for the diagnosis of chronic pulmonary aspergillosis. Aspergillus antibodies (precipitins) were negative. Thoracic imaging didn't show cavities with a fungal ball present or nodules on. We started antitubercular drugs. The patient showed rapid clinical and radiological improvement.

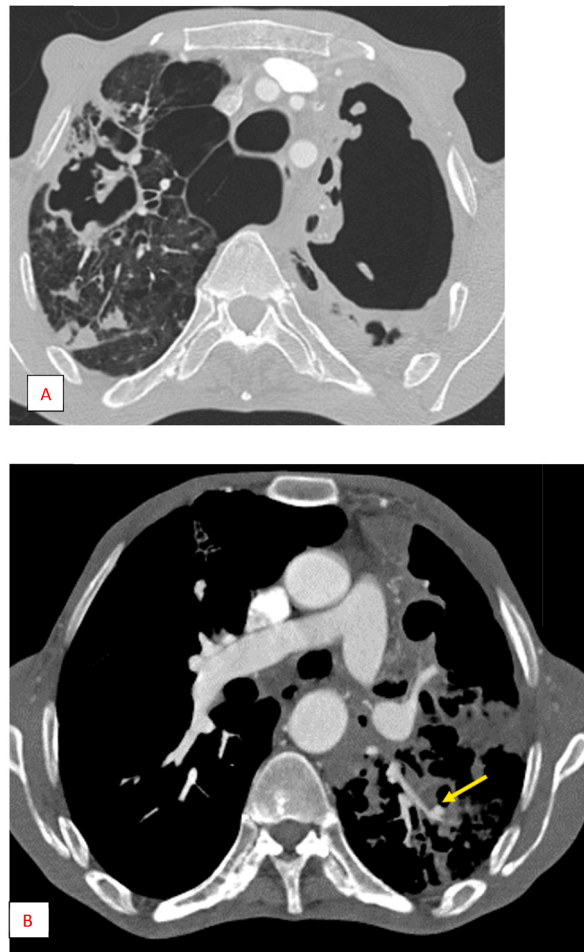


Fig. 2. Case 2
 A. CT lung window: left upper lobe destroyed, emphysema bubbles, a large cavity in the upper right lobe
 B. Post contrast CT thorax: left lower lobe aneurysm.

5. Discussion

The COVID-19 pandemic caused a delay in the diagnosis and management of many pathologies such as pulmonary tuberculosis (PT). Tunisia is endemic to tuberculosis. The incidence of tuberculosis in Tunisia is about 29/1000000 inhabitants in 2017. Pulmonary tuberculosis (PT) is the most common form of the disease, it represents 38% of all localizations [2]. Hemoptysis is a common presentation of PT. Bronchial arteries are the usual source of bleeding. When pulmonary arteries (PA) are incriminated, hemoptysis can be life-threatening and massive [3]. Rasmussen's aneurysm (RA) is an inflammatory pseudo-aneurysmal dilatation of a branch of a PA adjacent to a tubercular cavity [1]. It occurs secondary to the infiltration of granulation tissue into the adventitia and media. It is then replaced by fibrin leading to thinning of the vessel wall, herniation into the lumen of the cavity, and subsequent aneurysm formation [3]. Rasmussen aneurysm (RA) occurs in active PT with a delay in diagnosis and treatment. Moreover, we noticed an increase in this rare diagnosis incidence in the COVID-19 era. We reported three cases of RA complicating active PT in the COVID-19 era. Before this pandemic, we have not diagnosed cases of RA. Limited data have estimated the prevalence of RA in patients with chronic cavitary TB. A study by Auerbach et al., in 1939 reviewing autopsy findings showed an incidence of 4% [4]. Another retrospective series reported a prevalence of 6.9% in 189 patients with massive hemoptysis and PT [5]. Only one case of PT and COVID-19 coinfection in an elderly man was recently published. CT scan showed the presence of pulmonary embolism and RA centered by a thrombus [6]. Continued inflammation causes rupture of the aneurysm into the cavity leading to hemoptysis [3]. The hemoptysis in RA can be minor and recurrent as in the first case, or major and fatal as in our second case. It is rarely asymptomatic and incidentally detected on the CT scan (case 3) [3]. CT pulmonary angiogram is an important diagnostic tool in patients with PT and hemoptysis. It can localize the source of bleeding in 63–100% [7]. The priority in massive hemoptysis is airway control to ensure oxygenation and ventilation [8]. Urgent angiographic embolization is required for the first-line management of major bleeding originating from either bronchial or pulmonary circulation [9]. Various methods of embolization were evaluated including coil packaging, stent-graft, and glue embolization with no advantage of one over the other [9]. Glue embolization was performed in our case (case 2). In patients where embolization fails, emergent surgery is the second therapeutic option [8]. Chronic, non-life-threatening hemoptysis associated

with pulmonary TB, though an important clinical problem, is generally managed with *anti*-TB drugs. On the other hand, massive hemoptysis, though relatively infrequent, can be life-threatening [10]. Embolization via bronchial artery angiography is becoming the preferred method for achieving massive hemoptysis or signs of active bleeding with reported success rates of up to 90% [11]. Emergency surgery is indicated for massive hemoptysis not controlled by rigid bronchoscopy or embolization. Nevertheless, surgery should be avoided in cases of active pulmonary tuberculosis given the significant postoperative mortality.

Learning points:

- Hemoptysis is frequent in PT. Meanwhile, it can be a symptom of RA; a rare complication of active PT with a delay in management.
- Urgent angiographic embolization is required for the first-line management of massive hemoptysis, especially in an infectious context where hemostasis surgery can be difficult.

6. Conclusion

COVID-19 pandemic has led to an overwhelming healthcare system causing a delay in the management of other infectious diseases such as tuberculosis. Rasmussen's aneurysm (RA) is a rare complication of pulmonary tuberculosis (PT). It appears in chronic cavitary and long-standing tuberculosis. We reported three cases of RA in the COVID-19 era with different presentations, treatments, and prognoses. Our findings emphasize the importance of timely therapeutic care for PT and RA to improve the prognosis.

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Declaration of competing interest

The author declares no conflict of interest concerning this paper.

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