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Case Report

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Massive Hemoptysis in a Pediatric Patient with Pulmonary Mycobacterial Infection

Mirza Baig MD[1*], Michael Joo MD[2], Jenna Reisler MD Candidate[3], Shawn Nishi MD[1]

[1]Department of Pulmonary, Critical Care and Sleep Medicine, University of Texas Medical Branch, Galveston, TX
[2]Department of Internal Medicine, University of Texas Medical Branch, Galveston, TX
[3]School of Medicine, University of Texas Medical Branch, Galveston, TX

[*]**Corresponding author:** Mirza Baig, MD, Division of Pulmonary Critical Care and Sleep Medicine, 5.140 John Sealy Annex 301 University Blvd., Galveston, TX 77555-0561. Phone: 805-404-2622; Email: mibaig@utmb.edu

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Abstract

Massive hemoptysis is rare but often life-threatening in the pediatric population, and can often lead to shock, respiratory failure and death. Most commonly this is associated with foreign body aspiration, vascular malformation or respiratory tract infections. We present a case of a previously healthy 14-year-old patient with massive hemoptysis leading to hemorrhagic shock due to mycobacterial infection. This case highlights the clinical presentation and guidance in management of massive hemoptysis in a pediatric patient secondary to infection.

Keywords: *Hemorrhagic Shock, Video-Assisted Thoracoscopic Surgery, Bronchial Artery Embolization, Mycobacterial Infection.*

Case Report

A 14-year-old Hispanic male, without significant past medical history, presented with expectoration of fresh blood of about 50 mL/day for 2 days. On examination he was tachycardic and tachypneic with (SPO2) of 95% on room air. **Chest radiograph (Figure 1)** showed a round density with air-fluid levels in the lower lobe of the right lung.

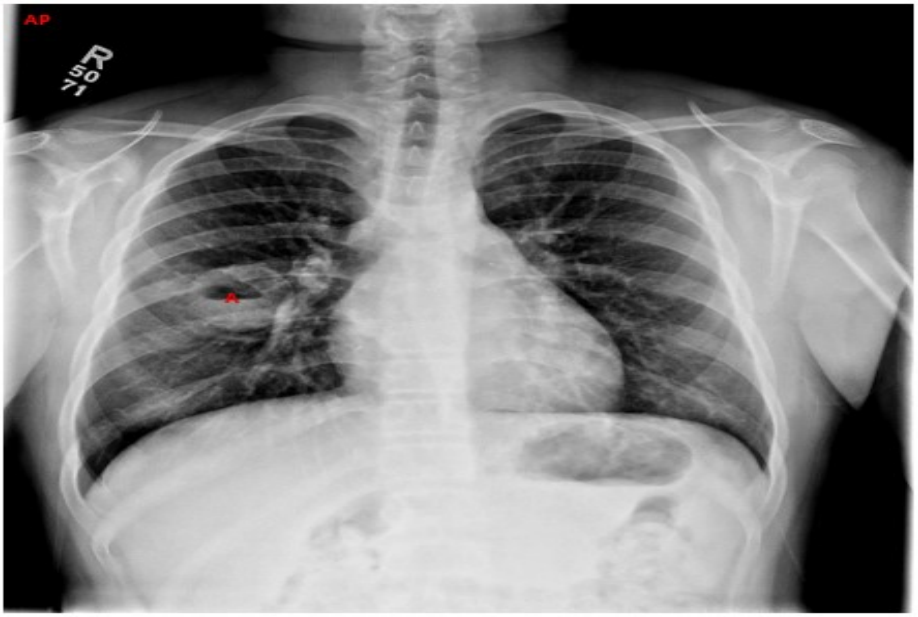

Figure 1A: Antero-posterior view chest x-ray obtained during initial admission. Red A indicates cavitary lesion 4.3cm in diameter with air fluid levels in the posterior right lower lobe.

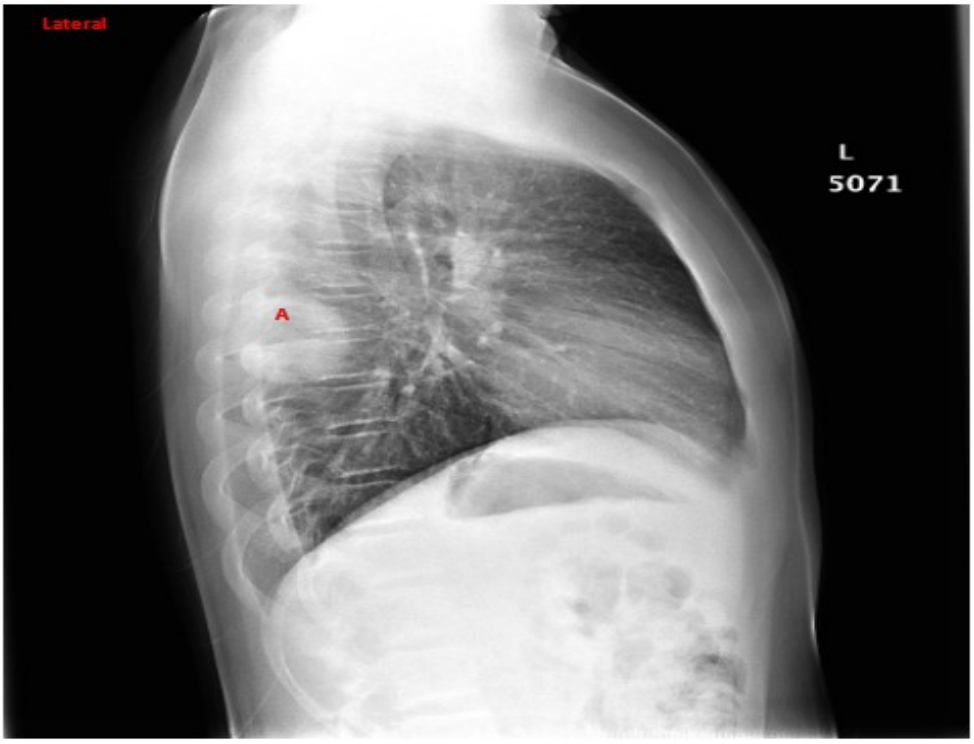

Figure 1B: Lateral view chest x-ray obtained during initial admission. Red A indicates cavitary lesion.

Chest CT (Figure 2) showed a 4.5 x 5.3 x 3.7 cm multi-loculated cavitary lesion. QuantiFERON-TB Gold test was positive, and his sputum stained positive for acid-fast bacilli (AFB) with *mycobacterium avium complex* (MAC) and *mycobacterium abscessus complex* (MABSC) isolates. He was discharged on a treatment regimen of rifampin, ethambutol, and levofloxacin.

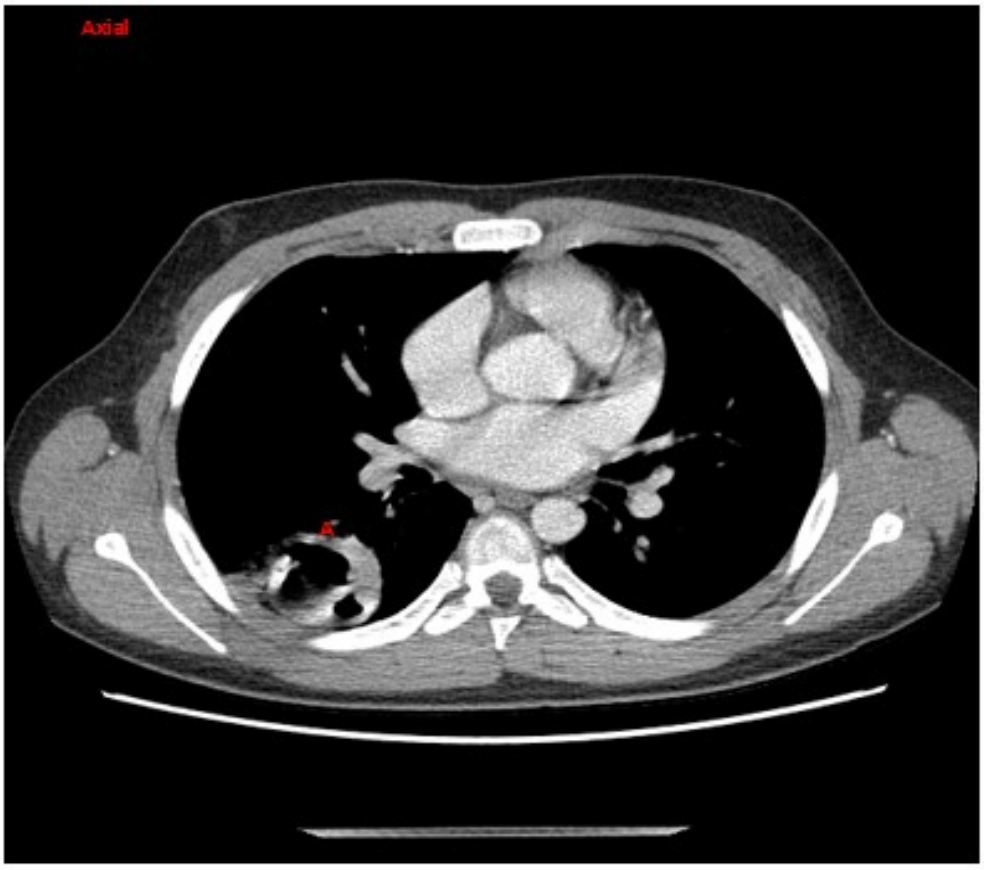

Figure 2: CT Chest with contrast in axial view obtained during initial admission. Red A indicates cavitary lesion.

Two months later, he presented with large volume hemoptysis (>300mL/day), chest pain and dizziness. On examination he was tachycardic, hypotensive (BP 69/38) with SaO2 92% on room air. Labs were significant for hemoglobin of 9.5 g/dL (13g/dL two months earlier) and leukocytosis, WBC> 30,000/microliters. A Chest CT (Figure 3,4,5) showed that the cavitary lesion had increased in size to 6.0 x 8.0 x 8.6 cm. There were ground glass opacities and air bronchograms scattered in the right lung consistent with alveolar hemorrhage, and hydropneumothorax. A chest tube was inserted immediately draining 1.8 liters of sanguineous fluid. The patient was admitted to the pediatric ICU and emergent Video-assisted thoracoscopic surgery (VATS) was performed, which revealed encasement of the right pulmonary artery and bronchus by a dense rind involving the parietal and visceral pleura restricting access to the pulmonary vein. Thus, the decision was made to proceed with an open thoracotomy. Due to the concern for recurrent massive bleeding, the decision was made to proceed with right lower lobe lobectomy. Meticulous dissection was carried out to isolate the pulmonary vein in its entirety. The pulmonary vein was then stapled and hemostasis was confirmed. Subsequently, the pulmonary artery and bronchus were isolated, these structures were noted to be encased with a dense rind. Once again with meticulous dissection, both these structures were stapled and hemostasis was confirmed. Finally, the apical portion of the right lower lobe was identified with its associated atypical vessels. This portion of the fissure was stapled completing the right lower lobe lobectomy.

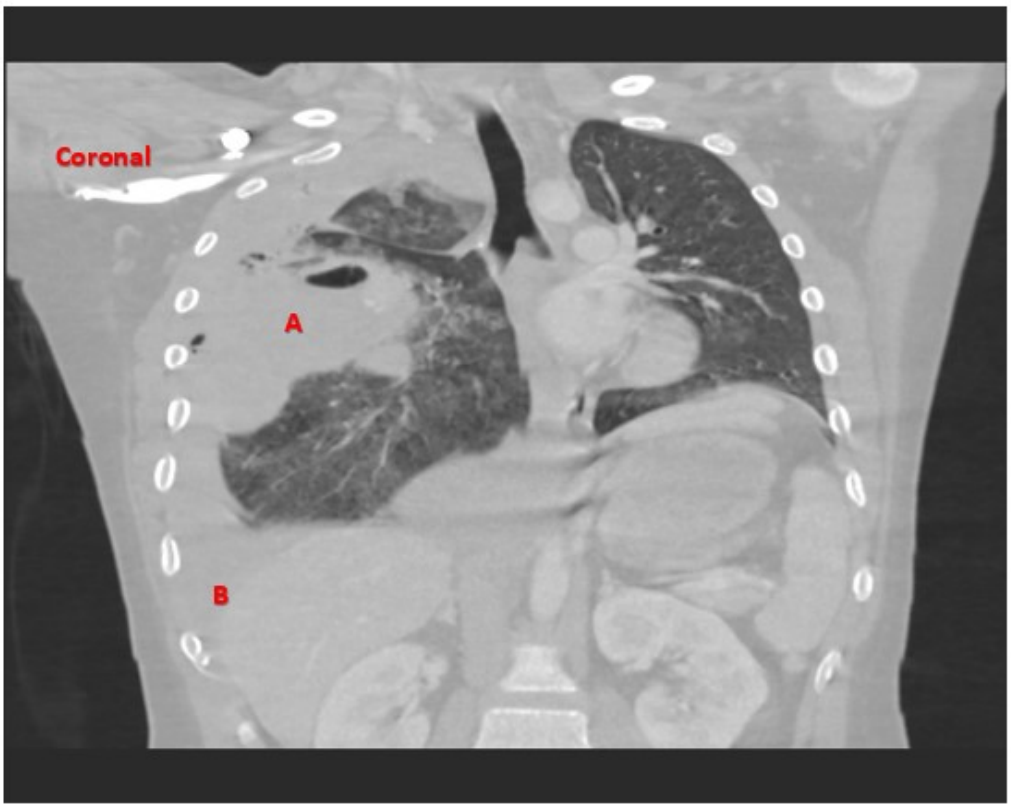

Figure 3: CT chest with contrast in coronal view during subsequent admission showing interval increase in right lower lobe pulmonary abscess (red A) with development of a right pleural fluid collection (red B) ultimately identified as hemothorax once evacuated.

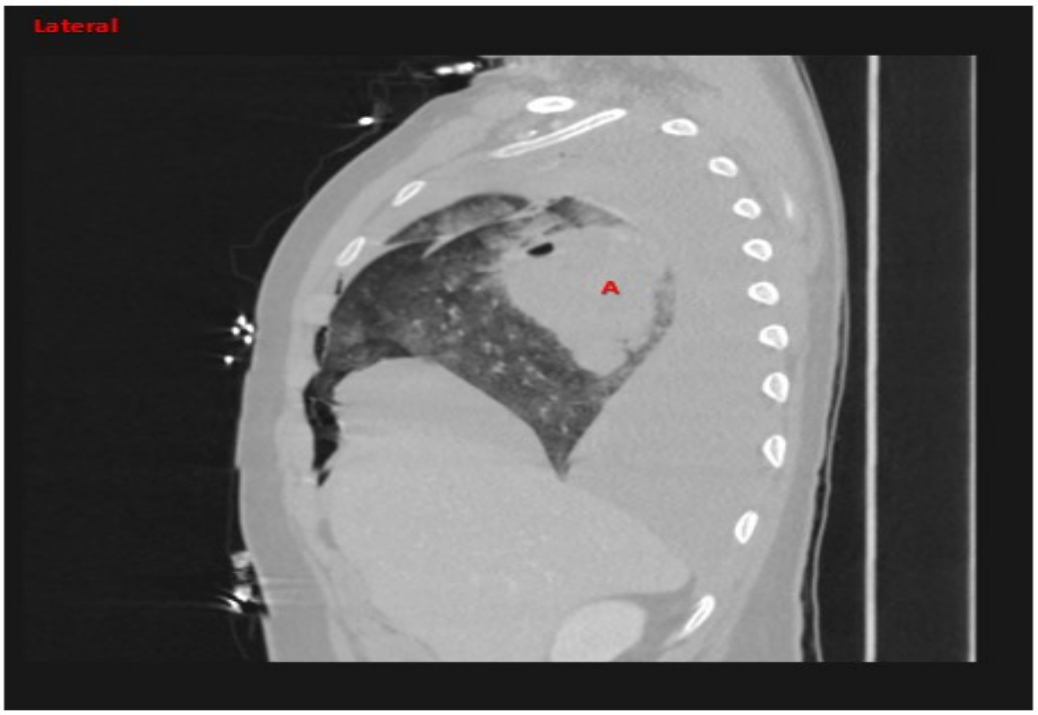

Figure 4: CT chest with contrast in sagittal view during subsequent admission with pulmonary abscess (red A).

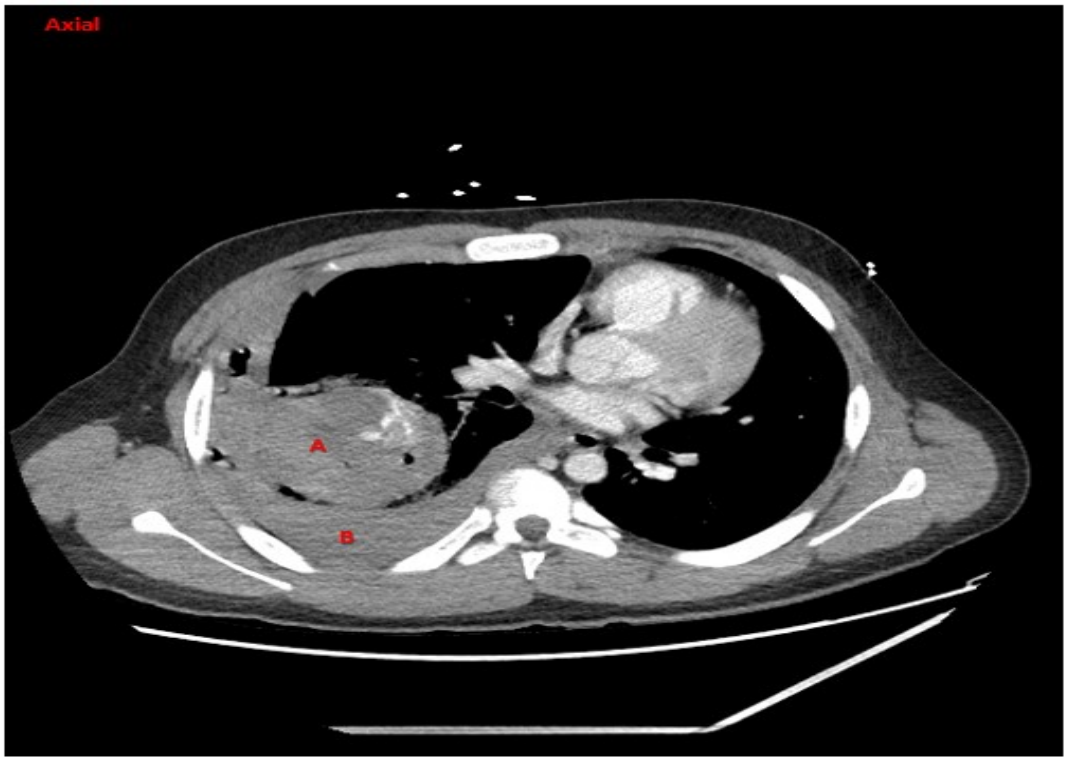

Figure 5: CT chest with contrast in axial view during subsequent admission with pulmonary abscess (red A) and right hemothorax (red B).

Pathologic exam of the resected lobe revealed a well-vascularized, necrotic abscess within the parenchyma, intraparenchymal hemorrhage and hematoma with necrosis. Cultures including AFB, bacterial and fungal stains were negative. No granulomas, masses, or further lesions were noted.

The patient was subsequently discharged with azithromycin, ethambutol, isoniazid, and rifabutin to cover for mycobacterium tuberculosis (M.tb), MAC, and MABSC as the causative organism remained in question . Since discharge, the patient has recovered with no repeat episodes of hemoptysis and has regained his baseline level of functionality.

Discussion

Massive hemoptysis, characterized by either blood loss > 50 ml/24 hours or by blood loss necessitating intensive care, rarely occurs among children but is a serious condition when present [1]. Causes of hemoptysis in the pediatric population vary but are most commonly due to lower respiratory tract infections, bronchial foreign bodies, bronchiectasis, as well as secondary to cystic fibrosis or congenital heart disease [2-4].

Hemoptysis due to these conditions varies in severity from minimal blood loss associated with persistent coughing to severe blood loss resulting in hemodynamic instability. Although mycobacterium tuberculosis (M.tb) is a respiratory tract infection known to cause massive hemoptysis in the adult population, this presentation is rare in children, as the most common form of the infection in the pediatric population is latent tuberculosis, which is typically asymptomatic [5].

Most cases of hemoptysis are initially controlled with bronchoscopy or with endoscopic bronchial artery embolization (BAE) because these methods are rapid, lifesaving, and less invasive. If bleeding is superficial and localized to larger airways then endoscopic techniques, such as cautery, laser, and local application of epinephrine can provide rapid resolution [6].

However, when these methods fail, the next option is BAE. However, rebleeding after BAE is relatively common with a recurrence rate of 28-50% depending on the causative condition [7]. BAE is contraindicated in patients with coagulopathies, contrast allergy, or renal disease due to the increased risk of bleeding and renal damage associated with angiography. It is mainly indicated for patients who are poor surgical candidates or serves as a bridge to definitive therapy [8-10]. As a result, hemoptysis is more commonly being managed with surgical resection of the damaged lung segment as surgery offers a long-term solution with acceptable morbidity and mortality rates [10].

In this case, VATS was pursued as an initial treatment and diagnostic modality given the ambiguity surrounding the etiology of this patient's condition. Despite the cavitary lesion, negative sputum PCR results and only one sputum culture growth for MAC and MABSC does not meet diagnostic criteria for non-tuberculous mycobacterial infection [11]. Other indications for early VATS include extensive lung involvement, lack of local resources to complete timely BAE, or renal disease preventing use of contrast. This case provides an example of when to consider open thoracotomy should there be significant pleural damage restricting access to the pulmonary vessels and bronchus [11].

In conclusion, pulmonary mycobacterial infections may present as life threatening massive hemoptysis in the pediatric population, despite being on medical therapy. Urgent first line treatment modalities include BAE and coil embolization; however, VATS should be highly considered as it offers additional benefits of obtaining tissue diagnosis that could further aid in the management of this condition while maintaining favorable long-term outcomes.

Conflict of interest: All authors declare no conflict of interest.

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Disclosures: None

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