

Behind the Wheeze: A Case of Delayed Tuberculosis Diagnosis in an Adolescent with Underlying Bronchial Asthma

Rinusha Manogaran^{1,2}, Nur Hanani Ahmad¹, Idimaz Hajar Jabbari¹, Hasni Mahayidin³

1 Department of Pathology, Hospital Sungai Buloh, Ministry of Health Malaysia
2 Department of Medical Microbiology, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia
3 Department of Pathology, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia

Introduction

Pulmonary tuberculosis (PTB) continues to pose a considerable threat to the adolescent population, particularly in those with underlying chronic conditions like bronchial asthma. This case highlights the diagnostic difficulties in an adolescent with PTB complicated by underlying bronchial asthma, where persistent cough was initially thought to be an acute asthma exacerbation, thus delaying the actual diagnosis.

Case Presentation

A 13-year-old girl with newly diagnosed bronchial asthma presented with a 4-month history of productive cough and shortness of breath. She also reported intermittent runny nose but denied any loss of weight, loss of appetite, or night sweats. She had no known sick contacts. Her asthma management included regular metered-dose inhaler of Salbutamol 200 µg, 2 puffs as needed and Budesonide 100mcg/dose inhaler, 2 puffs daily. She had no prior hospital admissions and claimed to be compliant with her medications. During her first visit to the healthcare facility, she was treated for an acute exacerbation of bronchial asthma secondary to an upper respiratory tract infection. Physical examination at that time was largely unremarkable except for scattered rhonchi in the lungs. Despite proper use of bronchodilators, her symptoms persisted. Ten days later, she presented to the emergency department with worsening symptoms. Examination revealed normal vital signs, but lung auscultation showed reduced air entry at the right lower zone. Chest radiograph demonstrated progression of pulmonary changes as compared to her initial presentation (Figure 1). Sputum acid-fast bacilli (AFB) smears came back as negative, and she was started on intravenous Augmentin 1.2 g TDS empirically. On day 3 of admission, a rapid polymerase chain reaction (PCR) testing was done for detection of *Mycobacterium tuberculosis* (MTB) and rifampicin and isoniazid resistance (Standard M10 MDR-TB) which returned positive, confirming tuberculosis (TB) infection. She was then started on intensive phase of anti-tuberculosis therapy with Akurit-4 (3 tablets once daily), along with pyridoxine and was discharged in stable condition with Symbicort as maintenance/PRN, bromhexine, and a short course of prednisolone, with follow-up at the nearest health clinic.

Conclusion

This case underscores the value of considering PTB as the differential diagnosis in adolescents with underlying bronchial asthma. A high index of suspicion is needed in managing such patients, as the symptoms may overlap and can be easily attributed to exacerbations of bronchial asthma. Although adolescent PTB typically resembles adult-like disease, some cases may still present as paucibacillary PTB. Rapid molecular testing is crucial in diagnosing such smear-negative cases.

Discussion

Tuberculosis remains a major cause of morbidity in children and adolescents, with an estimated 1.2 million cases in 2022, although only half were reported to public health programs (1). Adolescents with pulmonary TB often present with intrathoracic disease, commonly showing cavitation and pleural effusions. They usually present with symptoms such as cough, fever, and weight loss, although these can sometimes be non-specific. In this case, the diagnosis was delayed because the patient’s symptoms were initially attributed to asthma exacerbations, underscoring how underlying bronchial asthma can mask TB and hinder timely diagnosis. Paucibacillary disease is not uncommon in adolescents, so negative sputum smears do not rule out TB. Molecular diagnostics, such as the STANDARD M10 MDR-TB PCR system, have performance analogous to GeneXpert, enabling rapid and highly sensitive detection of MTB and drug-resistance mutations. The M10 MDR-TB PCR assay has a reported sensitivity of 99% and specificity of 97.9%(2).

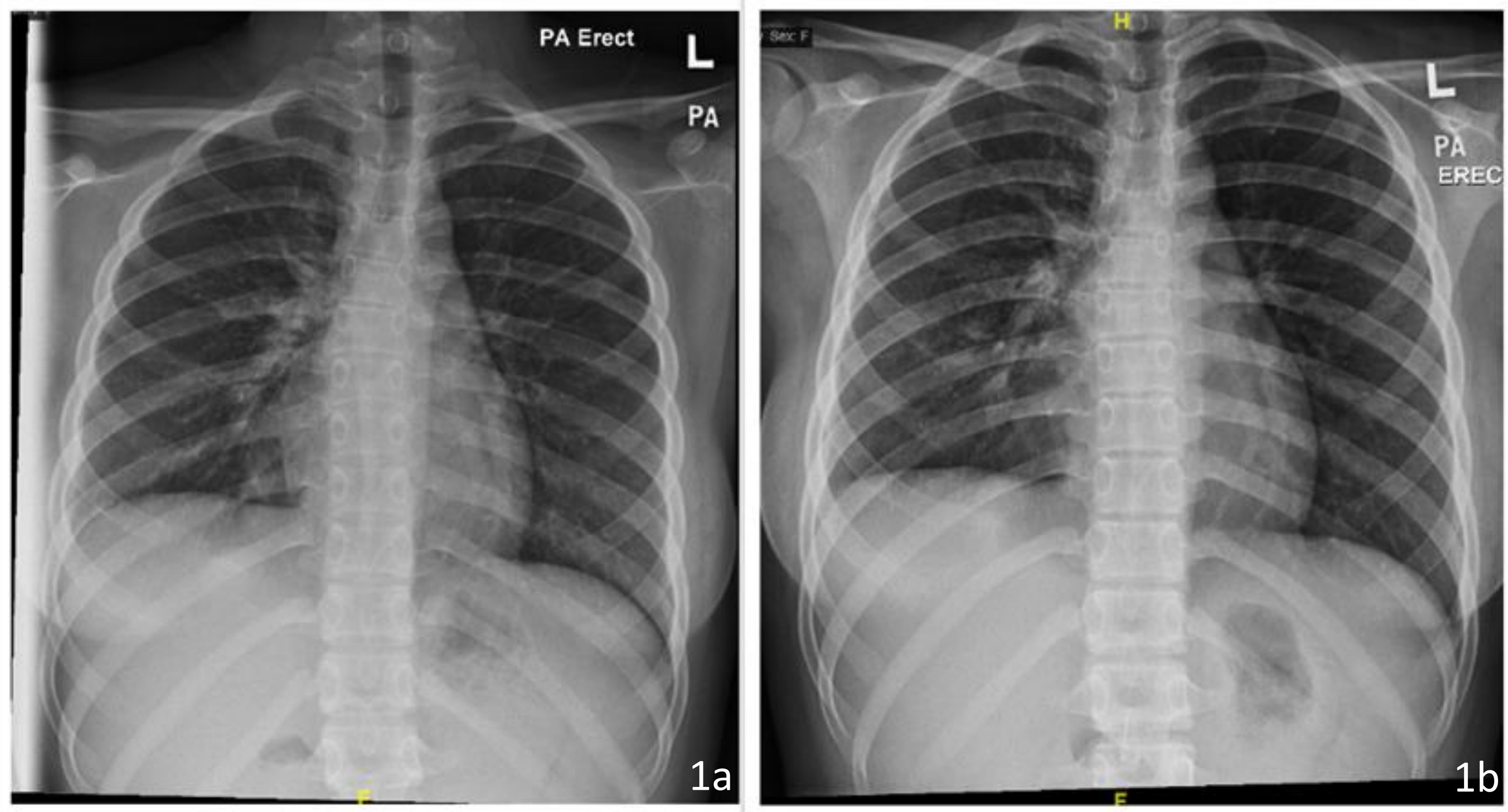


Figure 1: Chest radiographs showing subtle right perihilar haziness at initial presentation (a), with progression over six weeks to right mid and lower zone reticulonodular opacities, right pleural effusion, and elevated right hemidiaphragm (b).

Investigations	Results	Reference range
White blood cell	20.1 (N 70%, L 16%)	(4-10) x 10 ⁹ /L
Hemoglobin	11.6	12-15 g/dL
Platelet	510	(150-410) x 10 ⁹ /L
Urea	3.1	3.2-8.2 mmol/L
Creatinine	41	62-115 µmol/L
C-reactive protein	2.38	0.0-5.0 mg/dl
ESR	84	0-12 mm/hr
AFB smear x 3 (Sputum)	Negative	
M10 MDR-TB (Sputum)	MTB detected. Rifampicin and Isoniazid resistance not detected	

N = Neutrophil; L = Lymphocytes; ESR = Erythrocyte sedimentation rate; AFB = Acid-fast bacilli

References

1.Snow, K. J., Sismanidis, C., Denholm, J., Sawyer, S. M., & Graham, S. M. (2018). The incidence of tuberculosis among adolescents and young adults: a global estimate. *European Respiratory Journal*, 51(2), 1702352. <https://doi.org/10.1183/13993003.02352-2017>
2.Stephen, S., Kadye, A., Majuru, X. N., Madamombe, T., Sokwe, J., Madondo, T., Tinarwo, K., Tsuvani, L., Kawome, T., Malunga, F., & Simbi, R. (2024). Diagnostic Performance of STANDARD M10 Multidrug-resistant Tuberculosis Assay for Detection of Mycobacterium tuberculosis and Rifampicin and Isoniazid Resistance in Zimbabwe. *International Journal of Mycobacteriology*, 13(1), 22–27. https://doi.org/10.4103/ijmy.ijmy_194_23