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Case Report

A complex case of eosinophilic pleural effusion: an unconventional response to anti-tubercular therapy

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ABSTRACT

Eosinophilic tuberculosis (TB) is a rare form of TB characterized by the presence of eosinophils in pleural fluid. It remains an uncommon presentation and often poses a diagnostic challenge due to its resemblance to other conditions with eosinophilic pleural effusions. Here, we present a detailed case report of a 26-year-old female who presented with a two-week history of on-and-off fever, non-productive cough, and exertional dyspnea. Physical examination revealed absent air entry in the left infra-scapular and intra-axillary areas. Routine investigations and chest X-ray indicated a moderate left-sided pleural effusion with peripheral eosinophilia. Liver and kidney function tests were within the normal range. A left pleural tap was performed, and the pleural fluid analysis demonstrated an exudative effusion with predominantly eosinophils. Additional investigations, including ADA levels, Genexpert for TB, TB PCR, C-ANCA, P-ANCA, and total IgE levels, were performed to rule out other possible causes of eosinophilia, but the results were all negative or normal. No growth was observed on culture. Based on clinical history, examination findings, and investigation results, a diagnosis of eosinophilic TB was considered. The patient was started on empirical anti-tubercular drugs, which led to a favorable response and near-complete resolution of pleural effusion after 6 weeks of treatment. Regular follow-up and monitoring were conducted, and the patient completed a 6-month course of anti-tubercular treatment. This case report highlights the importance of considering eosinophilic TB in the differential diagnosis of pleural effusions, especially in young patients with no history of allergies or other underlying conditions.

Keywords: Eosinophilic TB, Pleural effusion, Empirical anti-tubercular drugs, Case report

INTRODUCTION

Tuberculosis (TB) remains a significant global health burden, and its diverse clinical presentations can pose diagnostic challenges.[1] Eosinophilic TB is a rare subtype characterized by the presence of eosinophils in pleural fluid. The condition is often underdiagnosed, leading to delays in initiating appropriate treatment. Here, we present a detailed case report of a young female with eosinophilic TB, emphasizing the importance of timely recognition and the management of this rare form of the TB.

CASE REPORT

A 26-year-old female presented to the outpatient department with a two-week history of fever on and off, along with non-productive cough and exertional dyspnea for the past week. The patient denied any history of weight loss, night sweats, or hemoptysis. She had no significant medical history, and there was no family history of TB or other chronic illnesses. On examination, the patient was conscious, oriented, and afebrile. Her vital signs revealed a pulse rate of 86/min and blood pressure of 130/80 mmHg. Auscultation of the chest

revealed absent air entry in the left infra-scapular and intra-axillary areas.

Routine investigations, including complete blood count, liver function tests, and kidney function tests, were performed and found to be within the normal range. A chest X-ray was conducted, which revealed a moderate left-sided pleural effusion. A differential count of the peripheral blood showed peripheral eosinophilia (eosinophil count: 14%, absolute eosinophil count: 700 cells/µL). These findings raised suspicion of an underlying eosinophilic pathology.

Intrigued by the presence of peripheral eosinophilia and pleural effusion, we performed a left pleural tap after obtaining due consent. The pleural fluid was sent for analysis, and the results showed an exudative effusion with predominantly eosinophils (eosinophil count: 75%, absolute eosinophil count: 6000 cells/µL). The adenosine deaminase (ADA) level in the pleural fluid was 4 U/ml, which was within the normal range.

As pleural effusion with eosinophilia can be associated with various conditions, including parasitic infections, drug reactions, malignancies, and autoimmune diseases, further investigations were warranted to exclude these possibilities.[2] Genexpert for TB and TB PCR were performed to rule out TB infection, and both tests returned negative results. To assess for other possible underlying causes, we also conducted tests for C-ANCA, P-ANCA, and total IgE levels, but they all came back negative or within the normal range. Additionally, the patient had no history of recurrent allergies, skin spots, or bronchial asthma, and her total IgE levels were within the normal range, further excluding allergic etiologies.

Mycobacterial culture of the pleural fluid did not show any growth, indicating no active mycobacterial infection. Given the endemic nature of TB in some regions, a diagnosis of TB was still considered despite the negative TB-specific tests. False-negative results in TB testing are not uncommon, and clinical judgment plays a vital role in such scenarios.[3]

Taking into account the patient's young age, absence of a history of allergies or skin spots, normal total IgE levels, and the presence of eosinophilic pleural effusion, we suspected a diagnosis of eosinophilic TB. To confirm the diagnosis, we discussed the case with the infectious disease specialist, and it was decided to initiate empirical anti-tubercular drugs to ensure timely intervention. Empirical treatment for TB is sometimes necessary, especially in areas with a high prevalence of the disease, and when other potential causes of pleural effusion have been adequately ruled out.[7]

The patient was started on a four-drug anti-tubercular regimen consisting of isoniazid, rifampicin, ethambutol, and pyrazinamide. She showed good compliance with the treatment, and her symptoms gradually improved over the course of therapy. After six weeks of treatment, a repeat chest X-ray revealed near-complete resolution of the pleural effusion. The patient reported a decrease in her cough and exertional dyspnea.

Throughout the treatment period, the patient was regularly followed up, and her clinical and radiological progress was closely monitored. As per the standard guidelines for the treatment of TB, the patient completed a 6-month course of anti-tubercular treatment. By the end of the treatment period, she showed no signs of disease recurrence or drug-related adverse effects. Her chest X-ray showed complete resolution of the pleural effusion, and her eosinophil count returned to within the normal range. The patient was advised to continue with regular follow-up visits to ensure her sustained recovery.

Figure 1: Initial presentation.

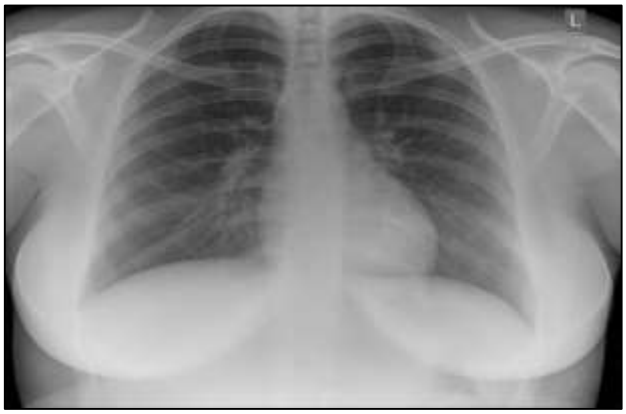

Figure 2: Four months later after treatment.

DISCUSSION

Eosinophilic TB is an unusual presentation of TB, and its diagnosis requires a high index of suspicion, especially in regions with a high TB burden.[2]

Eosinophilic pleural effusion is known to be associated with various conditions, making it essential to conduct a comprehensive evaluation to exclude other potential

etiologies like allergies, parastitic infections, Churgh Strauss syndrome, drug reactions, malignancies and other autoimmune disorders.[3]

The exact pathogenesis of eosinophilic TB remains unclear. It is believed to involve a hypersensitivity reaction to mycobacterial antigens, leading to the recruitment and activation of eosinophils at the site of infection.[4]

In this case, the marked eosinophilia observed in the pleural fluid raised suspicion of eosinophilic TB. The presence of predominantly eosinophils, along with the absence of malignancy or bacterial growth on culture, strengthened the likelihood of eosinophilic TB as the underlying cause.[4]

Despite the availability of various diagnostic tests for TB, false-negative results are not uncommon, and clinical judgment remains a key factor in diagnosing eosinophilic TB. In endemic regions or cases with high clinical suspicion, empirical anti-tubercular treatment can be initiated to prevent delays in starting appropriate therapy.[5]

The patient in our case showed a favorable response to empirical anti-tubercular treatment, with near-complete resolution of the pleural effusion after six weeks of therapy. Regular follow-up and monitoring were essential to ensure treatment compliance and assess the patient's progress.[6]

Early diagnosis and timely initiation of anti-TB treatment are essential to prevent complications and improve patient outcomes. Delayed or incorrect diagnosis of eosinophilic TB can lead to significant morbidity and mortality. Therefore, it is crucial for healthcare providers to be aware of the diverse clinical presentations of TB, including eosinophilic TB, to improve diagnostic accuracy and patient management.[8]

CONCLUSION

Eosinophilic TB is a rare and challenging presentation of TB, particularly in regions with a high prevalence of TB. This detailed case report emphasizes the need for a comprehensive evaluation of patients presenting with unexplained pleural effusions, especially in young individuals with eosinophilia. Clinical history, examination findings, and pleural fluid analysis play a crucial role in arriving at an accurate diagnosis of eosinophilic TB. In cases where eosinophilic TB is suspected, an early therapeutic intervention can prevent complications and improve patient outcomes. Healthcare providers should remain vigilant and consider eosinophilic TB in the differential diagnosis of pleural effusions, particularly in regions with a high TB burden.

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