

Acid-fast bacilli in pleural fluid cytology: A rare finding

Garima Agarwal¹, Natasha Singh¹, Samridhi Allhabadi², Suparna Dubey³, Gaurav Garg⁴

From ¹Assistant Professor, ²Junior Resident, ³Professor, ⁴Pathologist, Department of Pathology, School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh, India

ABSTRACT

Pleural effusion results from excess fluid production or decreased absorption or both. Tuberculous (TB) pleural effusion is one of the most common forms of extrapulmonary TB. Here, we present the case of a 25-year-old female who presented with chest pain, fever, and decreased appetite from the past 5 months. Her X-ray showed fluid deposition in the lungs. Pleural fluid was sent for cytological examination, 4–5 smears were made and stained with Giemsa, H and E, and acid-fast bacilli (AFB) stain to rule out the tubercular cause of the pleural effusion. Cytological smears were full of degenerated and intact neutrophils. Ziehl–Neelsen stain showed the presence of AFB. However, *Mycobacterium tuberculosis* is rarely observed on direct examination by AFB staining in pleural fluid. The patient was started with antitubercular drugs and there was a significant improvement in the symptoms of the patient.

Key words: Acid-fast bacilli, Cytology, Pleural fluid, Ziehl–Neelsen staining

Pleural effusion is defined as the abnormal collection of fluid in the pleural space. It can result from excess fluid production or decreased absorption or both. Pleural effusions are commonly classified as exudates and transudates on the basis of Light's criteria. The common causes of exudative pleural effusions include infective causes such as tubercular effusion, parapneumonic effusion, malignancy (both primary and metastatic), and collagen vascular diseases such as rheumatoid arthritis, systemic lupus erythematosus, and pulmonary embolism. The common causes of transudative pleural effusion include congestive heart failure, cirrhosis of the liver, nephrotic syndrome, and hypoalbuminemia [1]. Tuberculous pleural effusion (TPE) is one of the most common forms of extrapulmonary tuberculosis (TB) [2]. TB remains one of the most frequent causes of pleural effusion on a global scale [2]. Ziehl–Neelsen (ZN) staining and culture are the gold standards for diagnosing tubercular pleural effusion. However, *Mycobacterium tuberculosis* (MTB) is rarely observed on direct examination by acid-fast bacilli (AFB) staining in pleural fluid. Less than 30% of cultured pleural fluid samples are positive for *Mycobacterium* [3]. Furthermore, the laboratory culture of MTB requires 8 weeks to yield a positive result [4]. The other method considered for diagnosing TPE is a pleural biopsy, which is an invasive procedure that requires a high level of expertise. Therefore, in our case, bacilli were seen on ZN staining which helped in the proper treatment of the patient.

CASE REPORT

A 25-year-old patient presented to our department with complaints of chest pain, fever, and decreased appetite from the past 5 months.

On examination, the patient was thin built and mild pallor was present. The patient was slightly tachypneic with a respiratory rate of 20–24/min, blood pressure of 100/60 mm of Hg, and pulse rate of 110/min. Inspection revealed no specific findings. On palpation, the trachea was centrally placed and the chest expansion was 1.5–2 cm. On percussion, a dull note was present over the bilateral lower zone. Auscultation revealed decreased breath sounds on the right lower zone and bronchial breath sounds were present on the left lower zone. Mild coarse crepitation was present on the left lower zone. Tachycardia was present on cardiovascular examination. The rest of the examination was normal. No abnormality was detected on per abdominal and central nervous system examination. Her X-ray was done which showed mild fluid deposition in the right lower lobe of the lungs (Fig. 1).

Fluid was tapped which was thin consistency and yellow in color. Two milliliters pleural fluid was received in our laboratory which was dirty yellow in color and showed turbidity. Fluid was centrifuged through cytospin and dried and wet smears were made. Slides were stained with Giemsa, H and E, and ZN stains. Fluid was also sent to the biochemistry laboratory and microbiology laboratory for adenosine deaminase (ADA), protein, and sugar culture. Stained smears of pleural fluid cytology were viewed

Access this article online

Received - 30 May 2021
Initial Review - 14 June 2021
Accepted - 30 June 2021

Quick Response code



DOI: 10.32677/IJCR.2021.v07.i07.010

Correspondence to: Dr. Garima Agarwal, Department of Pathology, School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh, India. E-mail: garima.agarwal@sharda.ac.in

© 2021 Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC-ND 4.0).

and smears were full of intact and degenerated neutrophils on a background of abundant caseous necrosis (Fig. 2). ZN stain showed the presence of AFB (Fig. 3). The value of ADA was 26.2 which was close to its higher range which further suggests the diagnosis of tubercular pleural effusion. Sugar was 63 mg/dl and protein was 4.1 g/dl which further conclude the exudative cause of the pleural effusion. However, no growth in culture was seen after 48 h. The patient was started with antitubercular treatment, and on further follow-up, the patient showed a better prognosis.



Figure 1: X-ray showing pleural effusion

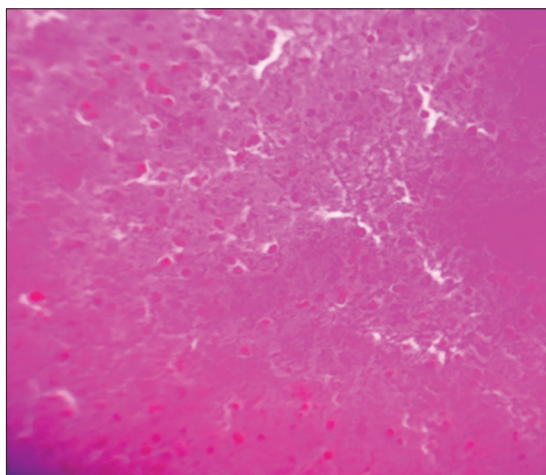


Figure 2: H and E stain 400× showing degenerated and intact neutrophils on the background of caseous necrosis

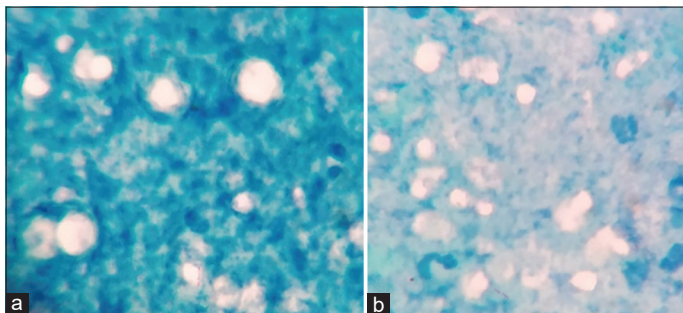


Figure 3: Ziehl–Neelsen staining showing acid-fast bacilli (marked with arrow)

DISCUSSION

Tubercular pleural effusion may cause a diagnostic dilemma as *Mycobacterium* could not be detected in most cases due to the paucibacillary nature of effusion [5]. The purpose of our case report is to present a rare finding of the presence of AFB in pleural fluid.

TB involves a T-lymphocyte-mediated cellular immune response; therefore, the level of ADA increases accordingly. ADA has been reported to be a sensitive and specific marker for diagnosing TPE [6]. Many studies stated that an ADA level below 40 U/L is said to virtually rule out the diagnosis of TB [7]. However, in our case, it was 26.2 and AFB was positive. The culture was negative in our case as also stated by Jamal *et al.* that culture is positive in 15–45% of cases of TPE [8].

The presence of AFB in the pleural fluid excludes the other causes like parasitic causes of pleural effusion in which eosinophilia is a very important finding. A study done by Tong *et al.* distinguishes TPE from parasitic pleural effusion [2]. Pleural effusions secondary to TB are largely unilateral with a slight right-sided predominance, reported to occur in many case reports, same as with our case. Our case shows the presence of AFB. A study done by Trajman *et al.* also showed the presence of AFB positive on pleural fluid microscopy [9].

The neutrophilic effusions are associated with acute causes such as parapneumonic effusions, pulmonary embolism, acute TB, and benign asbestos pleural effusions [1]. As in our case, cytology showed many intact and degenerated neutrophils. Differentials of our case include synpneumonic pleural effusion and TB empyema. Synpneumonic pleural effusion has a short history of 5–6 days in contrast to our case, as our patient had a long history. Fluid is thick and pus-like in the case of TB empyema. In our case, the fluid tapped was of thin consistency.

Studies on the microscopy for AFB in the pleural fluid for MTB are very scarce in the literature. In our case based on the findings of ADA, X-ray, and AFB staining, the diagnosis of TPE was made. This was in concordance with a study done by Vorster *et al.* who also concluded that the gold standard for the diagnosis of TB pleuritis remains the detection of MTB in pleural fluid, or pleural biopsy specimens, either by microscopy and/or culture, or the histological demonstration of caseating granulomas in the pleura along with AFB [4].

CONCLUSION

Cytological examination of pleural fluid is safe, reliable, and cost effective and can be used for diagnostic purposes. It is also less traumatic as compared to pleural biopsy. Cytology serves as a complete diagnostic modality, which aims at pointing out the etiology of effusion as well as the prognosis of the disease. Cytological examination when combined with other newer diagnostic tests increases the chances of accurate diagnosis of TPE and the presence of AFB in ZN staining in patients of pleural effusion aids in early diagnosis and management of the patient.

REFERENCES

1. Mandovra N, Vaidya PJ, Chhajed PN. Current approaches to tuberculous pleural effusion. *Astrocyte* 2017;4:87-93.
2. Tong S, Zhu Y, Wan C. Distinguishing tuberculosis pleural effusion from parasitic pleural effusion using pleural fluid characteristics. A case control study. *Medicine (Baltimore)* 2019;98:1-5.
3. Gopi A, Madhavan SM, Sharma SK, Sahn SA. Diagnosis and treatment of tuberculous pleural effusion in 2006. *Chest* 2007;131:880-9.
4. Vorster MJ, Allwood BW, Diacon AH, Koegelenber CF. Tuberculous pleural effusions: Advances and controversies. *J Thorac Dis* 2015;7:981-91.
5. Santra A, Nandi S, Kundu S, Sen A. Pleural fluid smear AFB positivity: To search for underlying immunosuppression. *Bangladesh J Med Sci* 2006;15:286-8.
6. Liu Y, Ou Q, Jian Z, Shen L, Zhang B, Weng X, *et al.* A combination of the QuantiFERON-TB gold in-tube assay and the detection of adenosine deaminase improves the diagnosis of tuberculous pleural effusion. *Emerg Microb Infect* 2016;5:e53.
7. Bays AM, Pierson DJ. Tuberculous pleural effusion. *Respir Care* 2012;57:1682-4.
8. Jamal I, Dwivedi RP, Singh RV. Diagnostic value of cytological examination of pleural fluid in tuberculosis. *J Evid Based Care Health Med* 2018;5:4-10.
9. Trajman I, Pai M, Dheda K, Smit RV, Zwerling AA, Joshi R, *et al.* Novel tests for diagnosing tuberculous pleural effusion: What works and what does not? *Eur Respir J* 2008;31:1098-106.

Funding: None; Conflicts of Interest: None Stated.

How to cite this article: Agarwal G, Singh N, Allhabadi S, Dubey S, Garg G. Acid-fast bacilli in pleural fluid cytology: A rare finding. *Indian J Case Reports*. 2021;7(7):298-300.