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Bronchoalveolar Lavage Fluid Caseating Granulomas in A Case of Pulmonary Tuberculosis

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Abstract Pulmonary tuberculosis (TB) is a common infectious disease that is considered one of the leading causes of morbidity and mortality worldwide. Special diagnostic studies for TB can be used including smear microscopy and cultures for acid fast bacilli (AFB) and Mycobacterium tuberculosis (MTB) nucleic acid amplification test (NAAT). The specimen is usually taken from the sputum but might also include pleural and bronchoalveolar lavage (BAL) fluids. In addition, BAL cytology and lung biopsy are commonly done if bronchoscopy is performed. Here, we present a case of suspected pulmonary TB in a patient who was complaining of cough and hemoptysis for several months. Chest x-ray showed right upper lung opacity with cystic changes that was confirmed by CT chest. Work up done for this case included three samples of sputum and one BAL fluid specimen for AFB smear microscopy, culture and NAAT in addition to transbronchial lung biopsies and they were all negative. However, Cytologic examination of BAL fluid using Papanicolaou stain surprisingly showed evidence of intact caseating granulomas characteristic for tuberculous infection. Ultimately, the patient was started on the standard anti-TB regimen for 6 months with significant clinical improvement confirming TB diagnosis. To the best of our knowledge, this unusual cytologic finding in culture-negative BAL fluid coupled with unremarkable lung biopsy and persistently negative sputum samples for TB was never reported in the English literature.

Keywords: *pulmonary tuberculosis, mycomacterium tuberculosis, acid fast bacilli smear, nucleic acid amplification test, bronchoalveolar lavage, caseating granuloma*

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1. Introduction

Tuberculosis (TB) is an infectious granulomatous disease that has a high prevalence across the world. It typically affects the lungs but other organs can be affected. Pulmonary form of the disease usually presents with cough, shortness of breath or chest pain in addition to the constitutional symptoms like fever, night sweats, weight loss and fatigue. The formation of granuloma and its subsequent necrosis in response to the infection is considered one of the main mechanisms to control the tuberculous disease. Although it is commonly used as a diagnostic tool when demonstrated in the lung tissue, its exclusive presence in culture-negative bronchoalveolar lavage (BAL) fluid is considered very rare, especially in the setting of persistently negative sputum studies for TB and unremarkable lung biopsy. An unusual case of TB is presented in this article that was diagnosed based on the BAL fluid cytology findings showing intact caseating granulomas in the presence of chronic respiratory symptoms and suspicious radiological findings.

2. Description

39-year-old Saudi female presented with a chief complaint of productive cough with yellowish sputum for more than 6 months associated with few episodes of teaspoon-amount haemoptysis per week recently. She denied fever, chills, night sweats, loss of appetite and weight loss. The patient had no history of contact with sick patients or exposure to tuberculosis or recent travel. Past history was negative for any lung diseases.

Physical examination revealed fine crepitations in the right upper part of the chest. CBC, renal profile and liver function tests were normal. Autoimmune markers were unremarkable and HIV testing was negative.

Chest x-ray showed right upper lung opacity and cystic changes. CT with contrast was remarkable for tree-in-bud sign associated with severe cystic bronchiectasis involving the right upper lobe posterior segment besides tiny multiple middle lobe nodules accompanied by mild bronchial wall thickening. The patient was admitted and kept in airborne isolation for suspicion of pulmonary

tuberculosis. Sputum studies including three samples for AFB smear microscopy, culture and Mycobacterium tuberculosis (MTB) nucleic acid amplification test (NAAT) were all negative.

The patient subsequently had bronchoscopy during which BAL fluid was collected from the right upper lobe and sent to the laboratory for testing including cytology, AFB smear, NAAT, gram stain and cultures. After BAL, five transbronchial biopsies were performed. BAL fluid cytology using Papanicolaou stain showed evidence of acute inflammatory cells, histiocytes and fibrin arranged in groups of well-defined caseating granulomas, characteristic for tuberculous infection. However, transbronchial biopsies were negative for granulomatous inflammation or malignancy and the other BAL fluid studies including cultures were all unremarkable. The patient was diagnosed with pulmonary TB and then started on the standard anti-TB regimen for 6 months with gradual improvement in her symptoms. However, she was referred to thoracic surgery team for lobectomy due to the persistence of her severe bronchiectasis shown on repeat CT chest following the completion of her treatment and she successfully underwent right upper lobectomy.

3. Discussion

Pulmonary TB can be diagnosed using special diagnostic studies including cultures and smears for AFB and NAAT for MTB. The specimen is usually taken from the sputum but might also include pleural and BAL fluids. Other investigations of diagnostic value include cytology from BAL fluid and lung biopsy.

BAL is an excellent minimally invasive procedure to diagnose various lung conditions including infectious, malignant and immunologic disorders. It is a well-tolerated procedure when done under sedation with minimal complications and high diagnostic yield [1]. It is usually taken from the most pathologically affected lobe and in case of bilateral diffuse lung disease, the right middle lobe or the lingular lobe can give maximal diagnostic yield. In suspected patients of pulmonary tuberculosis especially those who are unable to produce sputum or their sputum are persistently negative for TB for at least three specimens in spite of high clinical and radiological suspicion of TB, BAL studies including cytology may be a useful tool that can give an accurate diagnosis [2,3,4].

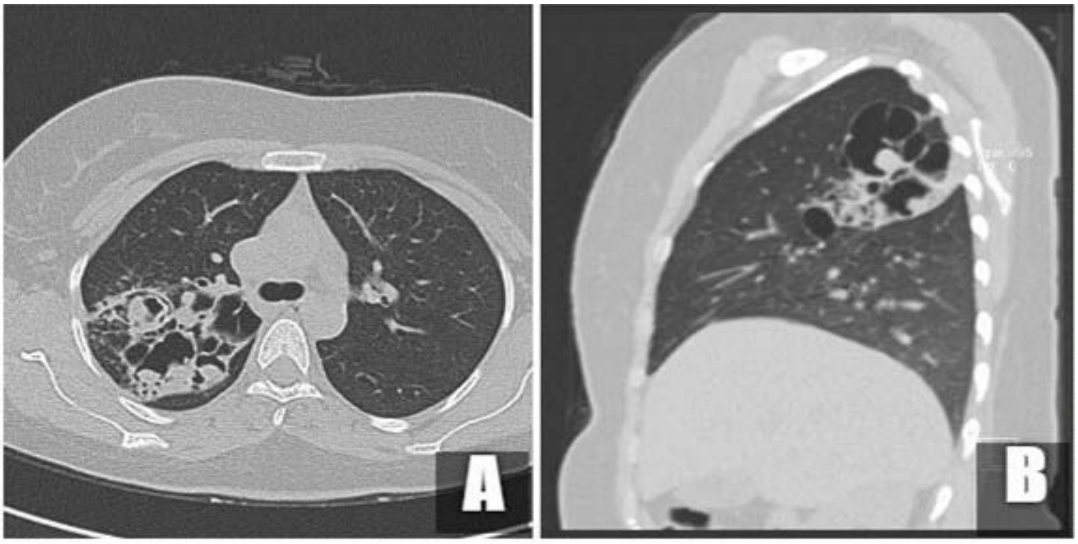

Figure 1. CT with contrast showed tree-in-bud sign associated with severe cystic bronchiectasis involving the right upper lobe posterior segment. Tiny multiple middle lobe nodules accompanied by mild bronchial wall thickening are also seen

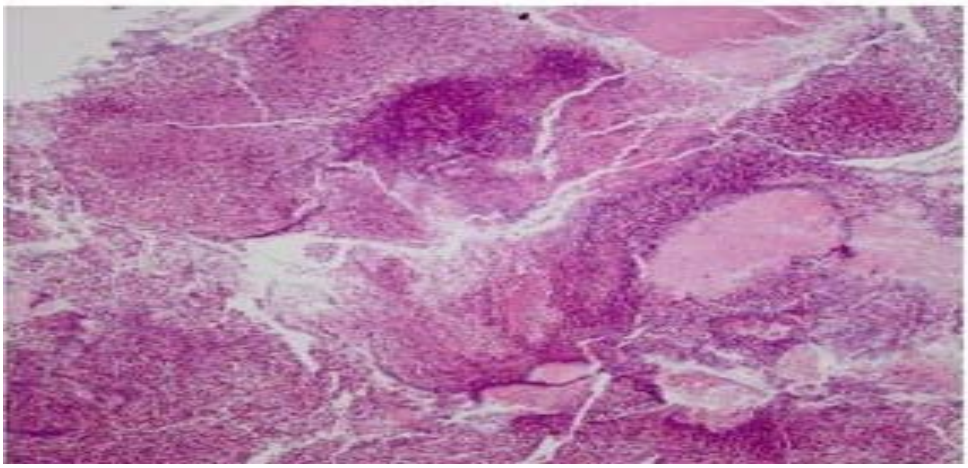

Figure 2. BAL fluid cytolological examination showed evidence of acute inflammatory cells, histiocytes and fibrin arranged in groups of well-defined caseating granulomas, characteristic for tuberculous infection

In our patient, three samples of sputum for AFB smear, culture and NAAT were all negative in spite of extensive lung disease. Sputum induction was not performed as the patient was able to expectorate sputum. So, we went ahead with the bronchoscopy and the BAL in view of high clinical suspicion of pulmonary tuberculosis. We were surprised to find classical caseating granulomas in the sample. As far as we know, there were some reported cases of pulmonary TB with evidence of BAL fluid caseating granulomas [5,6]. However, such a finding in culture-negative BAL fluid with persistently negative sputum studies for TB and unremarkable lung biopsy was never described previously in the English literature to the best of our knowledge.

4. Conclusion

Pulmonary tuberculosis is a common disease but can pose diagnostic difficulties. BAL fluid studies including cytology has to be performed even though sputum AFB and NAAT samples are negative as long as there is high clinical suspicion of pulmonary tuberculosis. Although tuberculous granuloma is a very rare finding in BAL fluid, it needs to be ruled out especially in suspected patients of pulmonary TB with negative initial work up.

References

[1] Levy H. Comparison of ballard catheter bronchoalveolar lavage with bronchoscopic bronchoalveolar lavage. Chest. 1994; 106(6): 1753-6.

[2] Liu X, Hou X-F, Gao L, Deng G-F, Zhang M-X, Deng Q-Y, et al. Indicators for prediction of Mycobacterium tuberculosis positivity detected with bronchoalveolar lavage fluid. Infect Dis Poverty. 2018; 7: 22.

[3] Lewinsohn DM, Leonard MK, LoBue PA, Cohn DL, Daley CL, Desmond E, et al. Official American Thoracic Society/Infectious Diseases Society of America/Centers for Disease Control and Prevention Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clinical Infectious Diseases. 2017; 64(2): 111-115.

[4] Mohan A, Sharma SK. Fibreoptic bronchoscopy in the diagnosis of sputum smear-negative pulmonary tuberculosis: current status. Indian J Chest Dis Allied Sci. 2008; 50(1): 67-78.

[5] Verma K, Sandhyamani S, Pande JN. Cytologic diagnosis of pulmonary tuberculosis by bronchoalveolar lavage. Acta Cytol. 1983; 27: 211–212.

[6] Sharma SK, Pande JN, Verma K. Bronchoalveolar lavage (BAL) in miliary tuberculosis. Tubercle. 1988; 69 (3): 175-178.