Case Report

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Young Immunocompetent Individual Positive for Histoplasma Capsulatum on Bronchoalveolar Lavage Fluid Cytology

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ABSTRACT

Primary pulmonary histoplasmosis is a lung disease caused by dimorphic fungus Histoplasma Capsulatum. Bronchoalveolar fluid cytology is routinely performed as an inexpensive test even in under equipped laboratories. A 26 year old female, presented with persistent cough, evening rise of temperature and generalised weakness since 3 months and streaky hemoptysis since 3 weeks. CT showed consolidation in lower lobe of left lung and multiple mediastinal nodes in perivascular (aortic arch) region and in sub carinal region. Bronchoscopy showed purulent exudates in lower lobe (6th segment of left lung). Bronchoalveolar lavage fluid was obtained and subjected to cytological evaluation and microbiological examination for Acid Fast bacillus. Cytosmears revealed macrophages with engulfed clusters of single walled yeast cells. The suspicion of Histoplasma was raised and the fluid was sent for fungal culture and Antigen testing was performed.

Histoplasma Capsulatum can present in immunocompetent individuals and a strong suspicion must be made in patients with history of travel to endemic areas. Pathologist needs to look for the yeast cells even in immunocompetent individuals while routine screening of the BAL fluid cytosmears. Special staining may be resorted to, in individuals with high suspicion and positive history. Confirmation may be done by fungal cultures and antigen testing.

Keywords: *Histoplasma Capsulatum, Bronchoalveolar Lavage Fluid, Immunocompetent, Cytology*

Introduction

Primary pulmonary histoplasmosis is a lung disease caused by dimorphic fungus Histoplasma Capsulatum. It is common in endemic areas such as North and South America and parts of Australia, though it can be found throughout the world.[1] It is rare in India, but is endemic in some regions of West Bengal , the Gangetic plains and Western India. Sporadic cases have been reported from South India.[2] Pulmonary manifestation ranges from mild pneumonitis to severe acute respiratory syndrome.

Bronchoalveolar fluid cytology is routinely performed as an inexpensive test even in under equipped laboratories and may be useful to detect fungal infections on keen observation by the pathologist especially in immunocompromised individuals[3].

Case Report

A 26 year old female, presented to the pulmonology outpatient clinic of a tertiary care hospital in Hyderabad, Telangana with persistent cough, evening rise of temperature and generalised weakness since 3 months. She complained of streaky hemoptysis since 3 weeks. There were no similar complaints in the past and no family history of similar complaints. There was no history of weight loss or loss of appetite. She did not complain of any specific allergies. She was non smoker and had no addictive habituation. She gave no history of any medication. Professionally, she worked in Australia since 1 year in the food industry and had come to Hyderabad in South India for vacation.

General examination revealed that patient was average built, with no evidence of pallor, icterus, clubbing or cyanosis. No superficial lymphadenopathy was noted. Her vitals were stable. Respiratory rate was regular, increased (22/minute) and of thoracoabdominal type.

Systemic examination revealed no specific abnormalities. Lung sounds were normal on auscultation.

Laboratory investigations revealed that patient was mildly anaemic with Hemoglobin of 9.9g/dl. WBC count ($7.6x10^9$/l) and platelet count ($420x10^{11}$/L) were within normal limits. Random blood sugar and liver function tests were also within normal limits. Vitamin D levels were low. Serology for retrovirus was negative, collagen profile showed borderline raised ANA.

High resolution CT showed consolidation in lower lobe of left lung and multiple mediastinal nodes in perivascular (aortic arch) region and in sub carinal region.

Bronchoscopy showed purulent exudates in lower lobe (6^{th} segment of left lung). Bronchoalveolar lavage fluid was obtained and sent immediately to laboratory for microbiological and pathological examination.

The BAL fluid, on receipt, was subjected immediately to routine examination including cytological evaluation

and microbiological examination for Acid Fast bacillus which was reported as negative. CBNAAT report was also negative. The fluid received in Pathology lab was centrifuged at 3500 rpm and cytosmears were prepared from the centrifuged deposits. Smears were stained with hematoxylin & eosin stains and Geimsa stain and examined under microscope.

The cytosmears revealed macrophages with engulfed clusters of single walled yeast cells. Background showed neutrophils, lymphocytes, few ciliated columnar cells. The suspicion of Histoplasma was raised and the fluid was sent for fungal culture and Antigen testing was performed which subsequently confirmed the diagnosis of Histoplasma Capsulatum.

The patient was started on antifungal therapy and dramatic improvement was noted.

Discussion

Histoplasma Capsulatum is a dimorphic fungus found in soil. It exists as a mould in the environment. Soil rich in bird or bat guano, especially that found under blackbird roosts or next to chicken coops, supports the growth of the mould. The infection can present as necrotizing or non necrotizing granulomas. The yeast form is identified in vitro and in tissues and is characterised by oval, narrow-budding organisms inside and outside of macrophages. The organism is not capsulated, although it appears to be surrounded by a clear zone in tissues[3].

One of the most important role of BAL fluid is the detection of fungus in immunocompromised hosts. Histoplasma has been reported in sputum, bronchial washings, gastric washings and FNA's in patients with symptoms. The organism is small enough to make detection difficult and special staining may be required. On methanamine silver staining, it appears as a 2-4 µm round to oval single budding yeast like organism inside neutrophils or macrophages. Contaminants remarkably similar to Histoplasma are sometimes identified, however they are found extracellularly[4].

In India, Histoplasma is not considered endemic with prevalence being 0-12.3%. A case of disseminated histoplasmosis was reported in an apparently immunocompetent individual from north India by Sushruta Kathuriaet al[2]. A total of 61 immunocompetent patients with histoplasmosis were reported from India from 1995 to 2011, with pulmonary manifestation seen in only 11 out of 61 cases(18%)[2]. Age presentation varied from 3-83 years, but middle aged and elderly were more commonly affected.[2]None of these reported cases were from the Telangana state of South India[2]. This finding gave rise to the presumption that our reported patient probably contracted the disease in Australia where she was working. Wheat LJ et al studied that H.capsulatum was seen by Methenamine silver or Geimsa stain in 70.3% cases and isolated by culture in 88.9% cases while Histoplasma Capsulatum polysaccharide antigen was detectable in urine(92.6%) and serum(88.5%) of the cases[5]. Detection of Histoplasma Capsulatum antigen in bronchoalveolar lavage fluid may be helpful in patients with acute pulmonary histoplasmosis or disseminated disease with pulmonary involvement[6].

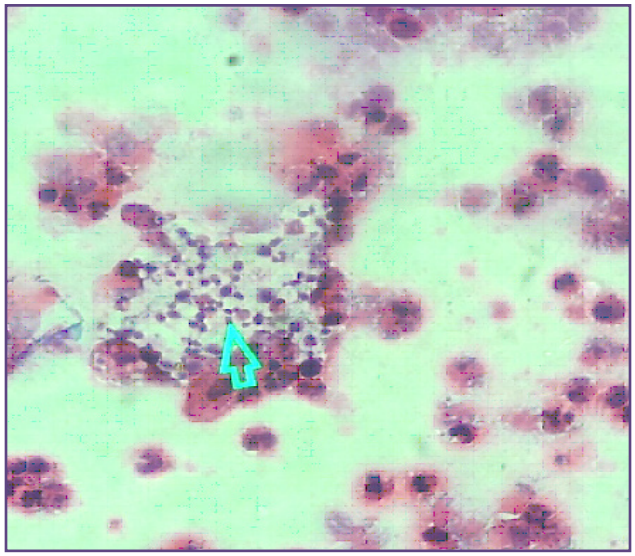

Fig. 1: H&E, 40X magnification. Image of BAL fluid showing macrophages with engulfed clusters of single walled yeast cells.

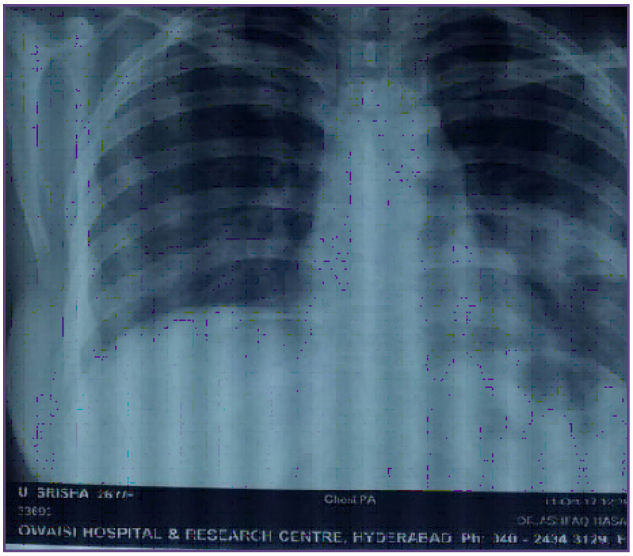

Fig. 2: Consolidation in lower lobe of left lung and multiple mediastinal nodes in perivascular (aortic arch) region and in sub carinal region.

Conclusion

Histoplasma Capsulatum can present in immunocompetent individuals and a strong suspicion must be made in patients with history of travel to endemic areas. BAL fluid cytology can be used as an inexpensive, quick and simple test to diagnose the condition. However, the pathologist needs to be aware and suspicious of the disease and must look for the yeast cells even in immunocompetent individuals while routine screening of the BAL fluid cytosmears. Special staining may be resorted to, in individuals with high suspicion and positive history. Confirmation may be done by fungal cultures and antigen testing.

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