

Original Research Article

Symptomatic, radiological profile of patients with endobronchial aspergillosis: a descriptive study

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Received: 18 June 2018

Revised: 16 August 2018

Accepted: 28 August 2018

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ABSTRACT

Background: Aspergillosis is a common presentation, involving respiratory system and is usually seen as a fungus ball that colonizes and grows into a pre-existing lung cavity, in the majority of cases secondary to pulmonary tuberculosis (PT). An endobronchial aspergilloma (EBA) is a rare disease, and another, but unusual, presentation of aspergillosis, characterized by the growth of *Aspergillus* species into the bronchial lumen. These two different presentations of aspergillosis can co-exist in the same patient. endobronchial aspergillosis, a variant of invasive aspergillus tracheobronchitis, a rare manifestation, where disease is limited to tracheobronchial tree without invasion of lung parenchyma and in many cases incidentally diagnosed, in a patient who had undergone a bronchoscopy to investigate haemoptysis, or for another reason.

Methods: Patients who were attending respiratory OPD with symptoms of cough with expectoration with immune compromised status or previous history of tuberculosis with abnormal chest X-ray were subjected to chest CT scan, with abnormal endobronchial mass in CT scan were further investigated with fiberoptic bronchoscopy and histopathological examination.

Results: 16 patients were diagnosed as endobronchial aspergilloma of which 11 patients were having past history of tuberculosis, 9 patients were having type 2 diabetes mellitus on treatment, 2 were having cardiac disease.

Conclusions: IATB is a rare manifestation caused by *Aspergillus* species affecting people with immunocompromised status or previous respiratory pathology like tuberculosis leading to formation of mass like growth obstructing the airway lead to respiratory distress and it should be taken as differential diagnosis in patients with previous respiratory pathology presented with mass like growth in bronchi.

Keywords: Aspergillosis, Bronchus, Endobronchial

INTRODUCTION

Aspergillus species is a group of ubiquitous fungus and they causes varied disease manifestation from simple colonization to invasive aspergillosis depending on host immune status and any pre-existing lung diseases. Pulmonary involvement of aspergillosis is usually classified with a pulmonary aspergilloma, ABPA, chronic necrotizing pulmonary aspergillosis, and invasive

aspergillosis.¹⁻⁴ In patients with a preexisting lung cavity from a variety of causes, such as pulmonary tuberculosis, sarcoidosis, or pneumoconiosis, aspergillus can colonize and grow into the cavity to form a pulmonary aspergilloma

Invasive pulmonary aspergillosis is the most common form of infection by aspergillus species among immune-compromised hosts, involving respiratory tract in 90% of

cases.¹ Although this infection frequently involves the lung parenchyma, it is unusual to find it limited to tracheobronchial tree, a condition known as invasive aspergillus tracheobronchitis (IATB).^{2,3} The diagnosis of this condition is usually delayed due to its non-specific presentation. Authors are presenting a case of variant of IATB in which the diagnosis was established by flexible bronchoscopy and biopsy.

The aim of the present study was to assess the symptomatic, bronchoscopic, and histopathological correlation of invasive aspergillus tracheobronchitis in western part of India

METHODS

The present study was conducted from 2012 September to January 2015 at Kamla Nehru Chest Hospital, Dr S. N. Medical College, Jodhpur, a tertiary care centre for respiratory diseases in western part of Rajasthan, India.

Inclusion criteria

All patients who were attending respiratory outpatient department of Dr S. N. Medical College with previous history of respiratory pathology like tuberculosis, any immunocompromised status with respiratory symptoms were included.

Exclusion criteria

- Patients with grade IV dyspnoea and severely ill to undergo bronchoscopic examination,
- Patients who denied consent,
- Patients with sputum positive tuberculosis (relapse),
- Patients with other major illness like cardiovascular, gastrointestinal diseases.

Patients who were attending respiratory OPD with symptoms of cough with expectoration with immune compromised status or previous history of respiratory pathology like Tuberculosis, sarcoidosis were evaluated with basic investigations like Complete blood count, chest X-ray. In these patients with abnormal chest X-ray were further investigated with chest CT scan. Patients with abnormal endobronchial mass were further investigated with fiberoptic bronchoscopy for BAL and transbronchial lung biopsy for histopathological examination. In bronchoscopy presence of an intraluminal mass with or without necrotic tissue sample was taken for biopsy. Histopathological examination of those biopsy showed septated fungal hyphae with acute branching angles, characteristic of aspergillus species was considered for the study, main differential diagnosis of the endobronchial growth was malignancy. Cases in whom histological examination revealed features suggestive of aspergilloma, detailed demographic data and history was taken. There was a correlation between clinical history, HRCT chest and bronchoscopy findings and histopathological examination.

RESULTS

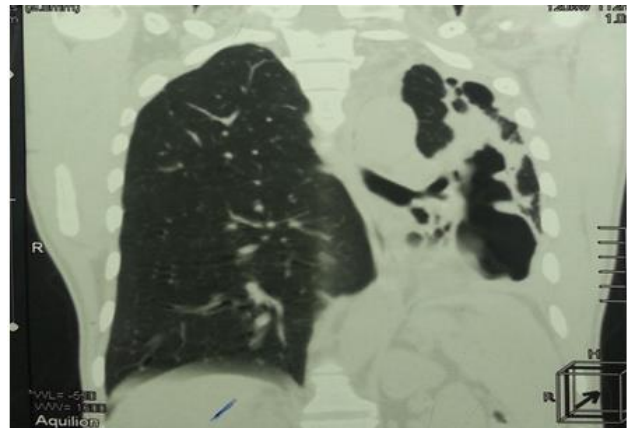
Male patients were the majority with 13 patients and remaining 3 patients were female, basic demographic details of the study population was as follows, mean age of the study group was 48 years, mean height of the group was 170.9cm, mean weight was 63.2kg. In all the patients of the study were excluded for Tuberculosis with sputum examination for AFB.



Chest x-ray showing in homogenous opacity in left lung with ipsilateral mediastinal shift.

Figure 1: Chest X-Ray PA View.

Sixteen patients were diagnosed as endobronchial aspergilloma of which 11 patients were having past history of tuberculosis, 9 patients were having type 2 diabetes mellitus on treatment, 2 were having cardiac disease,



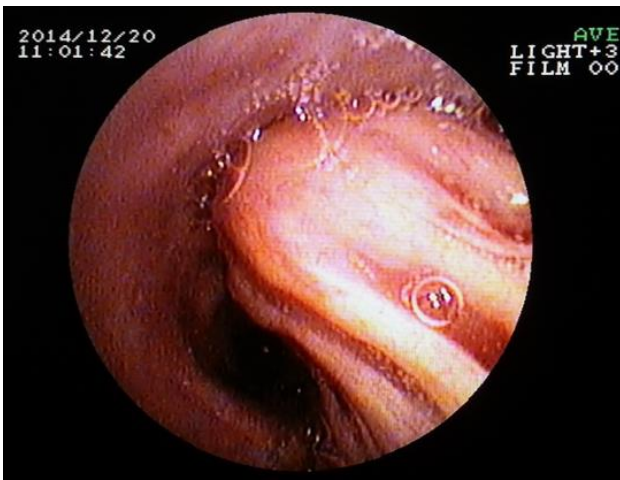
HRCT chest reconstructed coronal image shows abrupt cut-off of left upper lobe bronchus with compensatory hyperinflation of right lung in one patient.

Figure 2: HRCT Chest reconstructed coronal image.

Most common symptoms who were diagnosed with endobronchial aspergilloma was cough, dry in 11 patients and with expectoration in 5 patients, breathlessness was present in 13 patients 8 patients having grade II dyspnoea and 5 patients having grade III. most of the patients were having low grade intermittent fever. patients were

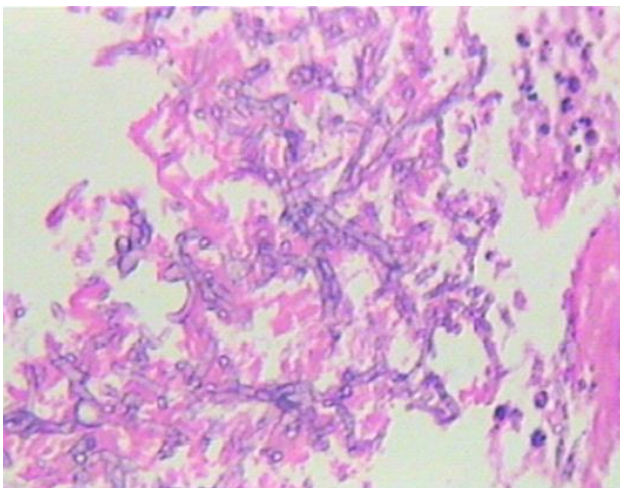
investigated to rule out active Tuberculosis through sputum for AFB in a designated laboratory. Total 9 patients were suffering from type 2 diabetes mellitus of which 7 were on oral hypoglycemic drugs and 2 were on human mixtard.

The chest radiography was abnormal in patients with features of fibrosis, fibrocavity with volume loss with ipsilateral mediastinal shift due to past history of tuberculosis, mass like lesion was present in 5 patients (Figure 1). HRCT chest in most of the patients showed endobronchial obstruction either partially or completely with volume loss and in homogenous consolidation (Figure 2).



Fiber optic bronchoscopy showing partially obstruction of left main bronchus.

Figure 3: Bronchoscopic view of IATB.



Histopathological examination shows numerous fungal filaments having branching at acute angle with spores.

Figure 4: Histopathological slide of IATB.

Since most of the patients were having endobronchial growth Bronchoscopy was performed and biopsy was taken (Figure 3). 5 of the 16 patients were having necrotic mass like lesion. Histological examination of the

collected tissue showed characteristic feature of Aspergilloma like septated fungal hyphae with acute branching angles (Figure 4).

DISCUSSION

Human aspergillosis can be classically divided as invasive, saprophytic or allergic. *Aspergillus fumigatus* is the species most commonly responsible for invasive aspergillosis, followed by *Aspergillus flavus*, *Aspergillus niger* and *Aspergillus terreus*.⁴ Invasive pulmonary aspergillosis is a severe disease, and can be found in severely immunocompromised patients, critically ill patients and those with COPD. These fungi can use the lower respiratory tract, sinuses or skin as entry portals to cause invasive infections. Inhalation of airborne aspergillus spores results in colonization of the respiratory mucosal surfaces. The progression from colonization to tissue invasion and the type of disease that patients develop depend mainly on their immune status and on local defense mechanisms.^{5,6} Three factors that always must be considered are whether patient is immunocompromised (higher risk of Invasion), whether disease is progressing and hyphae are seen (signaling invasive disease).⁷ *Aspergillus tracheobronchitis*, a variant of IATB is a rare and severe form of invasive pulmonary aspergillosis in which infection is entirely or predominantly confined to tracheobronchial tree, mainly affecting immunocompromised patients in approximately 75%. Young et al, reviewed the post-mortem findings in 98 cases of aspergillosis and found that the infection was limited to the tracheobronchial tree in only five patients.² Denning proposed a classification and unified terminology consisting of three types of *Aspergillus tracheobronchitis*: obstructive tracheobronchitis, ulcerative tracheobronchitis and pseudomembranous necrotizing bronchial aspergillosis (PNBA).^{8,9} The obstructive form is characterized by non-inflammatory, massive intraluminal growth of aspergillus species associated with thick mucus plugs that generally produce atelectasis. Ulcerative lesions can penetrate through the tracheo-bronchial wall and can create bronchoesophageal or bronchoarterial fistulas that may produce fatal hemorrhage.^{10,11} PNBA is characterized by extensive formation of whitish pseudomembranes composed of hyphae, fibrin and necrotic debris. Rather than three distinct entities, these morphologic variants may just represent different stages in the development of IATB.^{6,9} The outcome of ulcerative ATB is generally favourable with antifungal therapy, on the other hand, the prognosis is poor in patients with pseudomembranous and obstructive ATB with mortality reaching 78%.¹⁰ The clinical manifestations of IATB are entirely different from those of invasive pulmonary aspergillosis. The insidious presentation with non-specific symptoms and the paucity of findings in chest roentgenograms often delay the diagnosis, giving this disease an ominous prognosis.^{12,13} Airway-related symptoms such as cough, dyspnea, wheezing and hemoptysis are cardinal features. There is little documentation of the radiologic features of

IATB in the literature. Bronchial aspergillosis can present radiologically with an obstructive pneumonia. The diagnosis of IATB is almost always confirmed by bronchoscopic examination, if possible biopsy needs to be taken even though it is invasive. Histopathological examination is required to establish diagnosis since isolation of aspergillus from respiratory secretion has poor predictive value for invasive pulmonary aspergillosis in immunocompromised patients.¹⁴ Histopathological examination showing septate, acute branching hyphae is definitive for fungal infection, it also allows to rule out other diseases like malignancy and non-fungal infections.¹⁵ This type of infection can progress very rapidly, leading to invasion of major vessels in the time between CT imaging and bronchoscopy, making routine bronchoscopic manipulation and sampling of debris extremely dangerous and even fatal.

CONCLUSION

IATB is a rare manifestation caused by *Aspergillus* species affecting mainly the people with Immunocompromised status or previous respiratory pathology like tuberculosis, sarcoidosis leading to formation of mass like growth obstructing the airway lead to respiratory distress and it should be taken as differential diagnosis in patients with previous respiratory pathology presented with mass like growth in bronchi. Treatment for IATB includes anti-fungal drugs like Azoles may be used with uncertain benefits but with surgical intervention, patients may have good prognosis.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Azeez AAM, Deepak UG. Symptomatic, radiological profile of patients with endobronchial aspergillosis: a descriptive study. *Int J Res Med Sci* 2018;6:3598-601.