



TO EVALUATE INCIDENCE OF ASPERGILLUS INFECTION IN PATIENTS WITH STRUCTURAL LUNG DISEASES

Pulmonary Medicine

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ABSTRACT

Background: Aspergillus is a fungus which is liable for a wide spectrum of pulmonary diseases ranging from allergic responses to invasive infections and is found to complicate many structural lung diseases. The purpose of our study was to evaluate the incidence of aspergillosis in structural lung diseases like bronchiectasis, cavitary lung diseases, COPD & lung fibrosis by detection of galactomannan in bronchoalveolar lavage. **Methods:** A total of 59 consecutive cases, 45 males and 14 females, who presented with respiratory symptoms and showed structural lung disease on radiological evaluation were enrolled in the study. Their clinical presentation, radiological features, BAL galactomannan levels were evaluated for diagnosis of aspergillosis. **Results:** Out of the 59 cases of various structural lung diseases, aspergillus infection was found in 14 cases (23.7%). Among the 14 cases with positive BALF GM, 6 had underlying bronchiectasis, 5 had cavitary lung disease, 2 had COPD and 1 patient had lung fibrosis. Majority of the cases who had aspergillus infection, had prior history of pulmonary tuberculosis (64%). **Conclusion:** In our study, the aspergillus infection was found to complicate a significant proportion of various structural lung diseases and more studies are required to confirm our findings.

KEYWORDS

INTRODUCTION

Aspergillus is a fungus which is liable for a wide spectrum of pulmonary diseases from allergic responses to invasive infections. Of the nearly 200 Aspergillus species identified, only 20 are considered to be pathogenic in humans. Aspergillus fumigatus is the most frequently identified of these species.

The degree of fungal invasion, response to antifungal therapy, and outcome of invasive aspergillosis depend on the type and severity of immunosuppression as well as the architecture of the lung parenchyma¹. In immunocompromised individuals, Aspergillus conidia germinate into the lung to form hyphae, the invasive form of the fungus, which causes a frequently fatal angioinvasive infection called invasive pulmonary aspergillosis¹.

The current gold standard for the diagnosis of proven IPA requires histological evidence. But the invasive procedures carry high risks for the patients with underlying diseases. The microbiological culture is also time-consuming and insensitive. Early diagnosis of aspergillosis is particularly important, and the bronchoalveolar lavage fluid galactomannan (BALF GM) test is a useful auxiliary diagnostic modality². In 2016, Infectious Diseases Society of America (IDSA) recommended BALF GM as a diagnostic marker for aspergillosis; they consider a cutoff value of 0.5 or greater to be positive for BALF³.

Study population included in this study was those with definite evidence of structural lung disease in any imaging study. Those patient with any contraindication to bronchoscopy were excluded. Diagnosed cases of allergic bronchopulmonary aspergillosis were excluded. Use of antibiotics causing false positive results in galactomannan assay were carefully looked upon. Aim of the study is to evaluate the incidence of aspergillosis in structural lung diseases like bronchiectasis, cavitary lung diseases, COPD & lung fibrosis by detection of galactomannan in bronchoalveolar lavage.

METHODOLOGY

This Study was conducted in Pulmonary medicine dept., Gauhati medical college & hospital from February 2022 to August 2022. It was a Prospective observational study. A total of 59 patients admitted to the hospital during the study period due to chronic respiratory diseases who showed underlying structural lung disease in HRCT Thorax were enrolled in this study. Ethics committee clearance was taken prior to study. A written informed consent was taken. Bronchoscopy was done

in all the cases and BAL fluid for Galactomannan were done. Galactomannan (GM) is a polysaccharide component of the cell wall of Aspergillus, which can be released into the body fluids by growing hyphae, such as blood, urine, and bronchoalveolar fluid (BALF). With using in vitro and animal models of IPA, it was found that GM might be released at an earlier stage and at a higher concentration into the BALF than in serum.¹ In 2016, Infectious Diseases Society of America (IDSA) recommended BALF GM as a diagnostic marker for aspergillosis; they consider a cutoff value of 0.5 or greater to be positive for serum or BALF. The method used to detect Galactomannan was sandwich type of ELISA for broncho alveolar lavage fluid.

RESULTS AND OBSERVATIONS

Out of the 59 cases of various structural lung diseases, aspergillus infection was found in 14 cases (23.7%). All the patients presented with cough, whereas 79.6% had shortness of breath and 35.6% had history of hemoptysis. Fever was present in 22% of cases whereas 10.1% patients had chest pain.

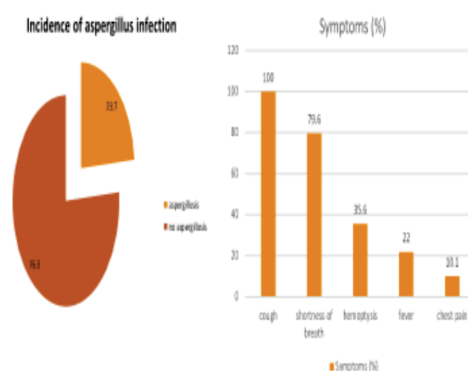


Fig: Symptoms Of Patients With Aspergillus.

Out of the 59 cases, 22 (37.2%) were having bronchiectasis, 14 (23.7%) were having cavitary lung disease while 17 (28.9%) had COPD and 6 (10.2%) had lung fibrosis.

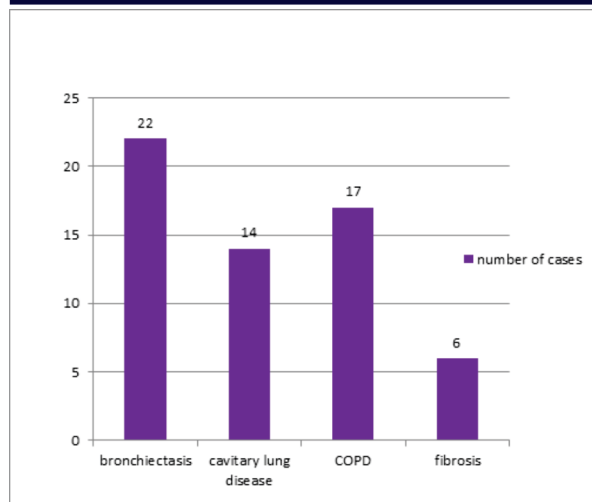


Fig: Different Type Of Structural Lung Diseases

In this study history of pulmonary TB was present in 85.7% of aspergillosis cases where as use of inhalational corticosteroid in 92.8%

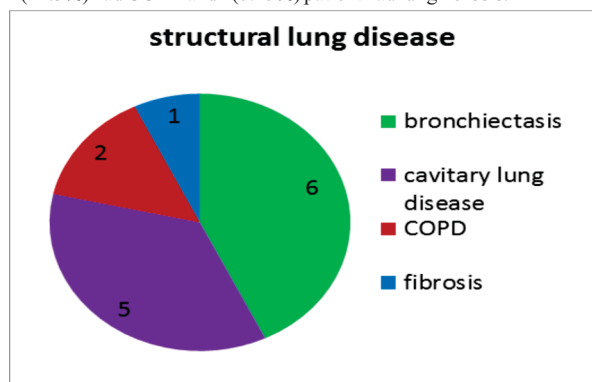
History of pulmonary tuberculosis



History of ICS use



Among the 14 cases with positive BALF GM, 6 patients (42.85%) had underlying bronchiectasis, 5 (35.7%) had cavitary lung disease, 2 (14.3%) had COPD and 1 (7.15%) patient had lung fibrosis.



Evaluating incidence in one particular group of patients, aspergillosis was seen in 27.2% cases among Bronchiectasis patients, in 35.7% cases among patients with Cavitary lung disease, in 11.7% among COPD group and in 16.6% among the patients with lung fibrosis.

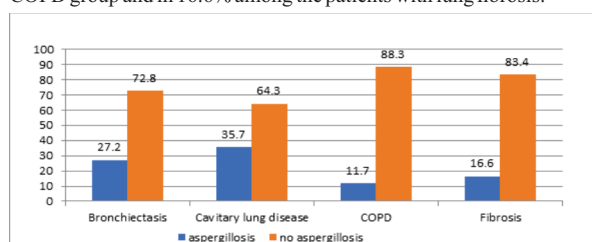


Fig: Incidence Of Aspergillus In Structural Lung Diseases

DISCUSSION

In this study the out of 59 patients total incidence of aspergillus infection in various structural lung diseases was found to be 23.7%. All the patients presented with cough, whereas 79.6% had shortness of breath and 35.6% had history of hemoptysis. The distribution of symptoms were similar to the study conducted by Haase et al.⁴ and J. Guinea et al.⁵

Past H/O pulmonary TB was given by 85.7% of the patients with aspergillus infection, which is comparable to the previous study conducted by N.Iqbal et al.⁶ where TB was the underlying cause of pulmonary aspergillosis in 86.6% patients.

Also 13 out of 14 (92.8%) cases who had pulmonary aspergillosis gave the history of use of inhaled corticosteroids which was similar to that of the previous studies.

Among bronchiectasis patients, the incidence of aspergillosis was found to be 27.2% and it was comparable to the study carried out by G. Haase et al.⁴ where the incidence was found to be 30%. Among COPD patients, 11.7% had aspergillosis and similar finding was observed in the study conducted by J. Guinea et al.⁵ where 16.3% of the COPD patients were found to have pulmonary aspergillosis.

In our study, 35.7% of the cavitary lung disease cases had aspergillus infection and similar observation was made in the study conducted by Gafoor K et al.⁷

Finally, our study has a few limitations, the main being that it is a single-center study with limited number of patients. Also, we used only a single value of BALF-GM for diagnosing pulmonary aspergillosis.

CONCLUSION

In conclusion, the aspergillus infection was found to complicate a significant proportion of various structural lung diseases and more studies are required in this field to confirm our findings.

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