Prevalence of Invasive Aspergillosis Among (PTB) Patients in Kanchipuram, India

ABSTRACT

Background: Tuberculosis (TB) remains a major health problem worldwide. (PTB) is commonly associated with secondary aspergillosis. Repeated exposure of Aspergillus spores can aggravate the bronchial pathology and can manifest as asthmatic episodes.

Aim and Objective: Pulmonary invasive aspergillosis is difficult to evaluate. Culture based diagnosis is time consuming. Hence (PCR) was done to evaluate the invasive fungal aspergillosis in (PTB) patients.

INTRODUCTION

TB remains a health problem worldwide [1]. The lungs are primarily involved but the infections also occur in other organs [2]. The load of opportunistic infections have increased tremendously due to increase in immunocompromised conditions of host [3]. Fungal infections are becoming more frequent because of expansion of high risk population and use of treatment modalities that prolong the survival of these patients. (PTB) is the most commonly associated disease in cases of secondary aspergillosis [4]. The reason for increased prevalence of disease is the inefficiency of immune system and the use of Antituberculosis Treatment (ATT), which promote growth and reproduction of fungal flora and in turn aggravate the underlying pathology [5].

Invasive aspergillosis infections may manifest in several different forms, but more common in bronchopneumonia [4]. The opportunistic fungal disease in immunocompromised patients with pre-existing disease and with long history of antibiotics. In the world more than a million people develop Chronic Pulmonary Aspergillosis (CPA) while having retreatment for TB [6].

The spores are released in large numbers ambient air, remain airborne for many hours and they are inhaled by humans [6]. Aspergillus finds a comfortable abode in damaged or scarred pulmonary tissue like pre existing cavities or bronchiectatic areas. Mycelia grows inside the cavity and forms ball like mass, without invading into viable tissue or blood vessels, the predisposing cause may range from TB, sarcoidosis, cavities in rheumatoid lung etc [7]. The pathologic reaction in human beings varies from simple colonization, allergic alveolitis, aspergillosma and invasive aspergillosis [8-10]. Repeated exposure of Aspergillus spore can precipitate and aggravate this immune mediated bronchial pathology and can manifest as asthmatic episodes [10]. The present study was carried out to assess the prevalence of invasive aspergillosis among (PTB). Culture based diagnosis of aspergillosis infection is time consuming and often has diagnostic sensitivity. The Galactomannan assay is to detect pathogens from Aspergillus genus but is susceptible to false positive result due to cross reactivity. PCR is the potential tool for diagnosis of Aspergillosis. Hence this study was taken up to find the prevalence of fungal infection among TB patients and also confirm the species of fungi by PCR.

MATERIALS AND METHODS

This study was done at Meenakshi Medical College Hospital and Research Institute Kanchipuram, Chennai - Bangalore, India, from Jan 2012 to Dec 2012. Study was approved by Institutional Ethical Committee. Informed written consent was obtained from all the study and control groups. The study group includes 80 sputum samples that were positive for pulmonary TB as per Revised National TB Control Programme protocol. 20 patients without TB were taken as control group and sputum samples were collected. Direct smear was done with 10% potassium hydroxide, Lacto Phenol Cotton Blue (LPCB) mount for identifying the fungus and culture on Sabourauds dextrose agar. All samples were processed and identified according to standard protocol. Growth was confirmed by repeated isolation for atleast 3 times. The species level identification was done. All Aspergillus were taken up for PCR. Universal primer and spieces specific primer were used. After amplifications the amplicons were visualized on 1.5 % agarose gel for presence of band and the gels were scanned under UV illumination, visualized, and digitized with the Gel Doc documentation system.

RESULTS

Out of 80 (PTB) sputum collected only 26 (32.50%) isolates were grown from 24 patients. All 24 patients showed smear and culture positive. Smeare and culture were negative for control group [Table/Fig-1]. Among the 26 isolates only 8 (30.76%) were found to be Aspergillus spp. [Table/Fig-2]. All the Aspergillus were taken up for PCR using species specific primer. The Aspergillus was amplified at 385 bp [Table/Fig-3,4]. No fungus was isolated from control group.

DISCUSSION

The prevalence of PTB with fungal co-infection is well documented in late 1960s. Treated PTB can lead to progressive loss of pulmonary function and chronic Aspergillosis [11]. CPA is a sequelae and is a

<table>
<thead>
<tr>
<th>Type of patients</th>
<th>Total number of cases</th>
<th>Number of fungal isolates</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>80</td>
<td>26</td>
<td>32.50%</td>
</tr>
<tr>
<td>Control group</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

[Table/Fig-1]: Showing the fungal growth in study and control group
Many fungal cell walls such as Fusarium, Acremonium species [16]. For diagnosing invasive aspergillosis Galactomannan assay has a sensitivity of 71% and specificity of 80% [17]. False positive and false negative values are common in Galactomannan assay because of certain antibiotics, histoplasma fungal infection and even certain foods can increase values of galactomannan assay [18] PCR can be used as a tool to detect invasive aspergillosis. Lack of standardization has limited its acceptance as a diagnostic tool and preventing its inclusions in disease forming criteria [19].

CONCLUSION

Diagnosis of opportunistic respiratory fungal infections poses a difficult diagnostic challenge due to lack of any pathognomonic clinical syndromes. Our opinion is to suspect fungal infection in all sputum positive patients. Fungal screening is highly recommended as routine investigation in microbiology for all cases of TB for aspergillosis to start antifungal therapy at the right time. PCR is a useful tool to diagnose the invasive aspergillosis and can guide for antifungal therapy.

ABBREVIATION

ATT-Antituberculosis treatment, PTB- (PTB), PCR- Polymerase chain reaction , IA-Invasive aspergillosis

REFERENCES


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