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# ASPERGILOSIS IN THE SUSPECTED TO THE TUBERCULOSIS PATIENTS

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## ABSTRACT

*Pulmonary aspergillosis indicates to fungal infection of respiratory tract which is caused by Aspergillus species with clinical presentation of illness, severity depending on condition. These infections are similar to tuberculosis. Therefore this disease can misdiagnose and mistreated as tuberculosis. Opportunistic infection of fungal in respiratory have distributed worldwide. In comparision to the tuberculosis fungal disease are more pathogens in immune comprised or exhausting patients. Most opportunistic pathogenic fungi are Aspergillus species and candida species. Infection of respiratory with Aspergillus can lead to clinical syndromes, from rapidly to fatal acute invasive infection to chronic pulmonary disease. Chronic and allergic forms of pulmonary aspergillosis are commonly considered as worldwide public health issue. Therefore common forms of aspergillosis or chronic pulmonary aspergillosis lead to secondary tuberculosis. The proportion of people suffering from tuberculosis each year is stable worldwide because of population growth. Allergic forms and chronic aspergillosis are more common than invasive disease, which have been relatively neglected.* ***Aim and Objective:*** *The objective of this study is to determine the co infection with clinical manifestations and outcomes of pulmonary aspergillosis with pulmonary tuberculosis in a tertiary care hospital and help to understand the nature of disease to improve the clinical outcome.* ***Method:*** *Total 150 sputum samples were collected from the patients attending to the hospital and processed in the lab for this study. Samples were processed by direct microscopy and fungal culture on two sets of Sabouraus Dextrose Agar. For the analysis of Acid Fast Bacilli (AFB) Zn Stain and Auramine-phenol fluorochrome technique was applied.* ***Result:*** *Aspergillus fumigates and commonly isolated species from suspected of pulmonary tuberculosis in this study. Out of total sample, 96(64%) were males and remaining 54(36%) were females and from the age group 0-60 years male participants were higher than female participants with a mean age of 25 years. 33(22%) were infected Aspergillus sp. In age group 20 to30 years (25.3%) was found as highest prevalence. None was found to be infected from the age group 0 to 10 years. 26(17.3%) were infected with mycobacterium tuberculosis in which age group 20 to 30 years (44.7%) was found that highest prevalence. None was found to be infected from the age group 0 to 10 years. 8(5.3%) patients were found to be infected with both infections as co-infection of Aspergillus Species - Mycobacterium tuberculosis.* ***Conclusion:*** *Aspergillosis commonly infected with A. fumigates and commonly isolated species from suspected of pulmonary tuberculosis in this study. Therefore it shows that the importance of aspergilosis as one of the diagnostic criteria in suspected as well as infected with tuberculosis. This study shows that aspergillosis is more common in middle age equal or above 30 years which can be accounted their immunity due to tuberculosis.*

**KEYWORDS:** Prevalence, Tuberculosis, Aspergillosis.

## INTRODUCTION

Aspergillosis is a diseases cause by the Aspergillus species that are ubiquitous saprophytic fungi. Opportunistic infection of fungal in respiratory have distributed worldwide. In comparision to the fungal disease Aspergillus species which are more pathogens in immunocomprised or exhausting patients. Aspergillus species and candida species are example of most opportunistic pathogenic fungi. Infection of respiratory with Aspergillus can lead to clinical syndromes, from rapidly to fatal acute invasive infection to chronic pulmonary disease.[1] Latter it can be characterized either allergic airways disorder nearly which is associated with asthma or chronic lung infection that can be complicated by massive haemoptysis and fibrosis.[2,3] Chronic and allergic forms of pulmonary aspergillosis are commonly considered as worldwide public health issue. Therefore common forms of aspergillosis or chronic pulmonary aspergillosis lead to secondary tuberculosis. Hence the most patients with pulmonary aspergillosis will be living in lacking sufficient resource where tuberculosis in common.[4,5,6 and 7]

Tuberculosis is a significant opportunistic infection in immunocomprised and transplant recipients'.[8] Mycobacterium tuberculosis (MTb) in the microorganism which is one of the major causative agent of pulmonary tuberculosis that infect respiratory tract. It is aerobic non motile and acid fast bacillus which infect one third of the world's population.[9] Because of population growth, the proportion of people suffering from tuberculosis each year is stable worldwide.[10] According to Centers for disease control and prevention (CDC), mortality of invasive Respiratory Aspergillosis(IRA) has increase by 35% and nearly 100% of mortality was untreated IRT.[11]

The clinical aspergillosis varies from the colonisation to the presence of fungus ball (aspergilloma) or in the form of an allergic response known as allergic bronchopulmonary aspergillosis (ABPA) to subacute invasive aspergillosis (SAIA) or chronic necrotising pneumonia and invasive pulmonary aspergillosis (IPA).[12]

Aspergillosis diagnosis is challenging, where chronic and allergic aspergillosis with clinical presentation concurrence with each other, and likely the major cases go undiagnosed.[12,13] Allergic forms and chronic aspergillosis are more common than invasive disease, which have been relatively neglected. Diagnosis of these conditions serological testing is main.[14,15,16] More than 90% cases of invasive aspergillosis are caused by Aspergillus fumigates and remaining by Aspergillus flavus, Aspergillus niger and Aspergillus terreus.[17] ABPA is a hypersensitivity reaction to Aspergillus antigen normally seen in asthma, atopy or cystic fibrosis. Whereas patients with previously form lung cavity Aspergilloma is found.[18] According to the report of WHO in 2011, globally approximately 1.2 million people have chronic pulmonary aspergillosis (CPA) as a outcome to tuberculosis (TB). Most of the cases were occur in Western Pacific African regions and South East. In developing countries structural lungs disease scarce data is available on CPA as a post TB.[19] Patients with various immunodeficiency and AIDS, opportunistic aspergillosis are serious threat as these infection may break out in epidemic proportions under favourable condition.

The objective of this study is to determine the coinfection with clinical manifestations and outcomes of pulmonary aspergillosis with pulmonary tuberculosis in a hospital and help to understand the nature of disease to improve the clinical outcome.

## MATERIAL AND METHOD

This is a retrospective study in patients admitted with pulmonary aspergillosis at Adesh Institute of Medical Sciences and Research Bathinda Punjab 151001 from Feb 2017 to April 2017 after the approval of the ethical committee. Patients presented with symptoms of pulmonary aspergillosis and pulmonary symptoms parallel to infection with Mycobacterium tuberculosis such as bronchiectasis, recurrent infections such as chest pain, fever and malaise, weight loss, dyspnoea, anorexia and whose chest radiograph shows similar features to tuberculosis were enlist into this study. Prior to specimen collection informed consent was obtained from each participant. Samples were processed by direct microscopy and fungal culture on two sets of Sabouraus Dextrose Agar. For the analysis of Acid Fast Bacilli (AFB) Zn Stain and Auramine-phenol fluorochrome technique was applied.

## RESULTS

Total 150 sputum samples were collected from the patients attending to the hospital and processed in the lab for this study. All the samples were examined for the presence of Mycobacterium tuberculosis and Aspergillus species.

**Table 1: Age and sex distribution of patients.**

| Age group | Male | Female | Total (Percentage) |
|---|---|---|---|
| 0-10 | 5 | 3 | 8(5.3) |
| 10-20 | 12 | 8 | 20(13.3) |
| 20-30 | 20 | 18 | 38(25.3) |
| 30-40 | 33 | 12 | 45(30) |
| 40-50 | 20 | 10 | 30(20) |
| 50-60 | 6 | 3 | 9(6) |
| **Total** | **96** | **54** | **150** |

Table 1. shows that total 150 was collected from the patients and was group according to the sex distributions; out of total sample, 96(64%) were males and remaining 54(36%) were Females. According to this study, from the age group 0-60 years male participants were higher than female participants with a mean age of 25 years.

**Table 2: Prevalence (%) of Aspergillus sp by Age and Gender.**

| Age Group | Total | Male (N=96) | Female (N=54) | Total (Percentage) |
|---|---|---|---|---|
| 0-10 | 8 | - | - | 0(0) |
| 10-20 | 20 | 1 | 2 | 3(15) |
| 20-30 | 38 | 12 | 5 | 17(44.7) |
| 30-40 | 45 | 5 | 2 | 7(15.6) |
| 40-50 | 30 | 3 | 1 | 4(13.3) |
| 50-60 | 9 | 1 | 1 | 2(22.2) |
| **Total** | **150** | **22** | **11** | **33(22)** |

Table 2 shows prevalence of Aspergillus sp. according to Age and Gender in which out of 150 participants 33(22%) were infected. The chi-square statistic is 0.1306. The *p*-value is 0.717832. The result is *not* significant at $p < .05$ between the rate of infection in males and females. The highest prevalence was found in age group 20 to30 years (25.3%). None was found to be infected from the age group 0 to 10 years.

**Table 3: Prevalence of M. tuberculosis by age and gender.**

| Age Group(Years) | Total | Male(N=96) | Female(N=54) | Total (Percentage) |
|---|---|---|---|---|
| 0-10 | 12 | - | - | 0(0) |
| 10-20 | 21 | 2 | 1 | 3(14.3) |
| 20-30 | 25 | 4 | 5 | 9(36) |
| 30-40 | 40 | 4 | 4 | 8(20) |
| 40-50 | 35 | 3 | 2 | 5(14.3) |
| 50-60 | 17 | 1 | - | 1(5.9) |
| **TOTAL** | **150** | **14** | **12** | **26(17.3)** |

Table 3 shows prevalence of Mycobacterium tuberculosis on the basis of age and gender in which 26(17.3%) were infected out of 150. The chi-square statistic is 1.4074. The *p*-value is 0.23. The result is *not* significant at $p < .05$ between the rate of infection in male and females. It was found that highest prevalence was found in age group 20 to 30 years (44.7%). None was found to be infected from the age group 0 to 10 years.

There were 8(5.3%) patients found to be infected with both infections as co-infection of Aspergillus Species - Mycobacterium tuberculosis. Among the 8 patients who were infected with Aspergillus sp and TB, 5 were infected with A. fumigatus, 2 with A. niger and 1 with A. flavus.

## DISCUSSION

This study describes the coinfection and clinical features and outcomes of aspergillosis and pulmonary tuberculosis. The prevalence of fungal infection with tuberculosis has increased recent years because of underlying risk factors.[20] For the diagnosis of Aspergillosis culture was gold standard but has low sensitivity. These organisms may also colonizers or contamination which its culture always does not shows infection. In this study 18(12%) were culture positive as compare with the study of Ved P et al.[21] This is high positive rate which could reflect colonization or contamination, therefore positive growth cases of Aspergillus spp. was reported only after significance assessing. Unfortunately, Antifungal sustibility test and antigen detection test were not available in our laboratory during the study period. Hence, reported of Aspergillosis could be an underestimate. Common isolated species of Aspergillosis in this study was A. fumigates followed by A. niger and A. flavus which is similar to the study of Patterson et al and Ved P et al. in which majority of patients were males.[22,23] Our findings to the prevalence in similar to the study reported by Shahid et al, and Bakare et al.[24,25] This study shows that Aspergillus species was more common in 20 to 30 years of age group (44.7%). Isolation of Aspergillous fumagitus is higher and A. flavus lower than study conducted by Malik et al and Razmpa et al[26], In the study prevalence of tuberculosis was observed 26(17.3%) which is comparable to the prevalence of infection with Aspergillus sp 33(22%).[27] In this study patients having tuberculosis infection associated with Aspergillus infection is very low 8(5.3%), which was similar to reported in few case report.[28,29] This kind of relationship was also observed by Sahoo et al.[30] This can be possibly justified that tuberculosis was the most important cause of chronic and sub-acute respiratory morbidity which most often leaves behind vulnerable to fungal colonization.[31]

## CONCLUSION

Aspergillosis commonly infected with A. fumigates and commonly isolated species from suspected of pulmonary tuberculosis in this study. Therefore it shows that the importance of aspergilosis as one of the diagnostic criteria in suspected as well as infected with tuberculosis. This study shows that aspergillosis is more common in middle age equal or above 30 years which can be accounted their immunity due to tuberculosis. Hence it is

one of the most common fungal infections in this group. Antifungal drugs should be used once its diagnosis.

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