Study to Determine Prevalence of Fungal Infection in Acute Exacerbation of COPD in Patients Attending Tripura Medical College and Dr. B.R. Ambedkar Teaching Hospital

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ABSTRACT

BACKGROUND
Chronic Obstructive Pulmonary Disease (COPD) is one of the most important causes of morbidity and mortality worldwide. Bacterial infection is the commonest cause of acute exacerbation of COPD. However fungal infections may also play an important role in causing acute exacerbation of COPD. This study was done to find out the prevalence of common fungal infections in COPD as the cause of exacerbation.

METHODS
We did a cross-sectional study among 50 patients admitted in Tripura Medical College with acute exacerbation of COPD over a period of 6 months from 1st July 2019 to 1st January, 2020.

RESULTS
Among 50 patients with acute exacerbation of COPD, 46% were having fungal isolates in their sputum. Fungal culture of 23 patients showed that 8 were having aspergillosis and 13 were having candida species in their sputum. Sputum of two patients revealed no growth.

CONCLUSIONS
Fungal infections may cause acute exacerbation of COPD. So, we need to keep in mind the association of fungal pathology in such cases for better management.

KEYWORDS
Chronic Obstructive Pulmonary Disease, Acute Exacerbation, Fungal Stain and Culture
BACKGROUND

Chronic Obstructive Pulmonary Disease (COPD) is one of the most important causes of morbidity and mortality worldwide. It is responsible for a huge social and economic burden on health care infrastructure. Most, but not all cases of COPD are attributable to smoking. COPD incidence and death rate among men has plateaued, but it continues to increase in women. The importance of COPD as a cause of hospitalizations and death is frequently underestimated. Infection is the major cause of acute exacerbation of COPD (AE COPD) of which bacteria are responsible for 30%-50% of cases. Fungal infections also play an important role in causing acute exacerbation of COPD. It is difficult to incriminate a specific organism as the cause for exacerbation due to chronic colonisation. A good knowledge about the common fungal agents involved in acute exacerbations and their antibiotic sensitivity pattern would help in better management of such patients. So there is a need to find out the common causative organisms causing exacerbations of COPD.

METHODS

50 patients admitted in Tripura Medical College with acute exacerbation of COPD during the study period were selected. Study was done over a period of 6 months in Tripura Medical College from 1st July 2019 to 1st January, 2020. A detailed history was elicited and complete examination was done. After rinsing the mouth with water, patients were asked to expectorate the sputum following deep coughs in a sterile wide mouth container with a lid. Quality of sputum was assessed by macroscopic and microscopic examination. Gram stain and fungal stain of sputum early morning samples were collected and brought to the Department of Microbiology for analysis. Samples were put for both bacterial and fungal culture. Colonies were then identified based on growth in culture media.

RESULTS

Table 1. Sex Distribution of Study Population

| Gender | Frequency | Percentage |
|--------|-----------|------------|
| Male   | 32        | 64%        |
| Female | 18        | 36%        |

Table 2. Age-Group Distribution of Study Population

| Age Distribution (years) | No. of Patient | % |
|--------------------------|----------------|---|
| <40                      | 16             | 32 |
| 41-60                    | 10             | 20 |
| 61-80                    | 15             | 30 |
| >80                      | 15             | 30 |
| Total                    | 50             | 100 |

Table 3. Prevalence of Various Infections in the Study Population

| Specimen | Aspergillus | Candida | No growth |
|----------|-------------|---------|-----------|
| Incidence| 8           | 13      | 2         |
| Percentage| 16%        | 26%     | 4%        |

DISCUSSION

In this study, we analysed prevalence of fungal infection in the sputum of patients hospitalized with acute exacerbation of COPD. 46 percentage of patients were having fungal isolates in their sputum which is quite a large number. Sputum culture report showed 13 patients were having candida species and 8 patients were having aspergillus fumigatus in their sputum. Various other studies also have documented incidence of fungal infection in patients with COPD. Barberan et al found that poor prognosis of IPA in COPD patients could perhaps be improved by faster diagnosis and prompt initiation of antifungal treatment. Murphy et al shows acquisition of P. aeruginosa is associated with the occurrence of an exacerbation of COPD. Bulpa P et al found in chronic obstructive pulmonary disease patients, invasive pulmonary aspergillosis currently carries a
very poor prognosis. Outcome could perhaps be improved by more rapid diagnosis and prompt therapy with voriconazole.\textsuperscript{9} Guinea et al found that IPA affects at least 22.1\% of patients with COPD and isolation of Aspergillus in culture\textsuperscript{10} Bafadhel M et al found that sensitisation to A. fumigatus was present in 13\% of COPD subjects and was associated with worse lung function.\textsuperscript{11} Jin Su et al in their study showed fungal population was typically dominated by Candida, Phialosimplex, Aspergillus, Penicillium, Cladosporium and Eutypella in acute exacerbation of COPD.\textsuperscript{12} Shumail Basir et al in their study found that fungi were demonstrated in the BAL fluid in 12.5\% cases. Majority of the isolates were Candida sp., found in 12 and Aspergillus sp. were isolated in three cases. Majority of patients with fungal positivity were above 70 years; however, this difference in terms of age was not statistically significant.\textsuperscript{13}

**CONCLUSIONS**

Not only bacterial infections, but also fungal infections may cause acute exacerbation of COPD. So, we need to keep in mind the association of fungal pathology in such cases specifically in non-responding individuals. Identification of fungal infection is very important because early diagnosis and treatment may reduce mortality and morbidity in such patients to a great extent.

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