

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

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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.¹ Most, but not all cases of COPD are attributable to smoking.² COPD incidence and death rate among men has plateaued, but it continues to increase in women.^{3,4} 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.^{5,6} 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

Gender	Frequency	Percentage
Male	32	64%
Female	18	36%

Table 1. Sex Distribution of Study Population

Age Distribution (years)	No. of Patient	%
<40	3	6%
41-60	10	20%
61-80	22	44%
>80	15	30%
Total	50	100%

Table 2. Age-Group Distribution of Study Population

	Only Bacterial Infection	Combined Bacteria-Fungal Infection	Only Fungal Infection
Incidence	16	13	10
Percentage	32	26	20

Table 3. Prevalence of Various Infections in the Study Population

<i>S. aureus</i>	<i>Klebsiella</i>	<i>Pseudomonas</i>	<i>Streptococci</i>	No Growth	Total
6	10	4	2	7	29
%	20.7	34.5	13.8	6.9	24.1

Table 4. Proportion of Bacterial Isolates in Study Population

Fungal Stain	Positive	Negative	Total
Incidence	23	27	50
Percentage	46	54	100

Table 5. Prevalence of Fungal Infection in Study Population

Specimen	Aspergillus	Candida	No growth
Incidence	8	13	2
Percentage	35	56	9

Table 6. Fungal Isolates in Study Population

Table 1 shows that majority of patients were males (64%) and rest were females (36%). As smoking is more prevalent in male population in our subcontinent, COPD was more seen in male patients. Table 2 shows that majority of patients were in age group 61-80 years (44%) followed by age group more than 80 years (30%) followed by age group 41-60 years (20%) followed by age group less than 40 years (6%). In our results, we found that a large proportion of patients i.e., 29 patients (58%) were having bacterial infection in their sputum followed by 23 patients (46%) having fungal infection in their sputum. 13 patients (26%) were having both fungal and bacterial infection in their sputum.

Table 3 shows that only bacterial infection was present in 32% population, combined bacterial-fungal infection present in 26% population, only fungal infection is present in 20% population. No death was reported in our study population. Table 4 shows that maximum bacterial isolates were of *Klebsiella* (34.5%) followed by *Staph. aureus* (20.7%) followed by *Pseudomonas* (13.8%) followed by *Streptococci* (6.9%). Table 5 shows that in patients with AE of COPD, 46% were having fungal isolate in their sputum. Table 6 shows individual species responsible for fungal infection in sputum in COPD patients. Among them 8 were having aspergillus and 13 were having candida species in their sputum and 2 patients were having no growth in fungal culture.

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.⁷ Murphy et al⁸ 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.⁹ Guinea et al found that IPA affects at least 22.1% of patients with COPD and isolation of *Aspergillus* in culture¹⁰ Bafadhel M et al found that sensitisation to *A. fumigatus* was present in 13% of COPD subjects and was associated with worse lung function.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.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.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.

REFERENCES

- [1] Jindal SK, Aggarwal AN, Chaudhry K, et al. A multicentric study on epidemiology of chronic obstructive pulmonary disease and its relationship with tobacco smoking and environmental tobacco smoke exposure. *Indian J Chest Dis Allied Sci* 2006; 48(1):23-29.
- [2] Rennard SI. COPD: overview of definitions, epidemiology, and factors influencing its development. *Chest* 1998; 113(4 Suppl):235S-241S.
- [3] Mannino DM. Epidemiology and evaluation of chronic obstructive pulmonary disease. *Hosp Physician* 2001; 37:22-31.
- [4] Mannino DM. COPD: epidemiology, prevalence, morbidity and mortality, and disease heterogeneity. *Chest* 2002; 121(5 Suppl):121S-126S.
- [5] Sethi S, Murphy TF. Bacterial infection in chronic obstructive pulmonary disease in 2000: a state-of-the-art review. *Clin Microbiol Rev* 2001; 14(2):336-363.
- [6] Morris A, Sciurba FC, Norris KA. *Pneumocystis*: a novel pathogen in chronic obstructive pulmonary disease? *COPD* 2008; 5(1):43-51.
- [7] Barberan J, Mensa J. Invasive pulmonary aspergillosis in patients with chronic obstructive pulmonary disease. *Revi Iberoam Micol* 2014; 31(4):237-241.
- [8] Murphy TF, Brauer AL, Eschberger K, et al. *Pseudomonas aeruginosa* in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2008; 177(8):853-860.
- [9] Bulpa P, Dive a, Sibille Invasive pulmonary aspergillosis in patients with chronic obstructive pulmonary disease. *Eur Respir J*. 2007; 30(4):782-800.
- [10] Guinea J, Torres-Narbona M, Gijón P, et al. Pulmonary aspergillosis in patients with chronic obstructive pulmonary disease: incidence, risk factors, and outcome. *Clin Microbiol Infect* 2010;16(7):870-877.
- [11] Bafadhel M, McKenna S, Agbetile J, et al. *Aspergillus fumigatus* during stable state and exacerbations of COPD. *Eur Respir J* 2014;43(1):64-71.
- [12] Su J, Liu HY, Tan XI, et al. Sputum bacterial and fungal dynamics during exacerbations of severe COPD. *PLoS One* 2015;10(7):e0130736.
- [13] Bashir S, Muzamil J, Guru FR, et al. Patterns of infections in chronic obstructive pulmonary disease exacerbations and its outcome in high dependency area, intensive care setting in a tertiary care hospital. *Community Acquir Infect* 2016;3(3):77-86.