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Microbiological Pattern in Acute Exacerbation of COPD- A Retrospective Study at MIMS, Mandya

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Abstract | **Original Research Article**

Background: Chronic Obstructive Pulmonary Disease (COPD) is a chronic disease which is characterized by persistent respiratory symptoms and airflow limitation that is not fully reversible. COPD is a major cause of morbidity and mortality throughout world including in India. Major reason for hospital admissions in these patients is exacerbation. An exacerbation of COPD is an acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day-to-day variations. Bacterial infections are the most common cause of acute exacerbation of COPD. ***Objective:*** To identify the common bacterial pathogens responsible in patients admitted with acute exacerbation of COPD to our hospital. ***Material and Methods:*** This is a retrospective study done at Department of General Medicine, MIMS, Mandya among patients admitted with acute exacerbation of COPD. 60 patients admitted with acute exacerbation are included in this study. Sputum culture reports obtained from case sheets, data entered into MS Excel sheet and analysed. ***Results:*** 60 patients were included in the study, of the 60 patients microbial isolates were seen in 43.3% (26) cases. Among positive culture, Streptococcus pneumonia is the most common pathogen isolated in 38.46% cases followed by pseudomonas aeuroginosa (23.07%), klebsiella pneumonia (15.38%), staphylococcus aureus (7.6%), H. influenza (3.84%), E. coli (3.84%), and Acinetobacter (3.84%). Sputum AFB was positive in 3.84% (1 patient). ***Conclusion:*** Streptococcus pneumoniae is the predominantly isolated pathogen in patients with COPD presenting with exacerbation and Ceftriaxone is the most effective antibiotic in these patients as it was effective against most of the organisms causing exacerbation.

Keywords: COPD, Exacerbation, Microbiological profile.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is defined as disease state characterized by persistent respiratory symptoms and airflow limitation that is not fully reversible [1]. COPD includes emphysema, chronic bronchitis and small airway disease. Often, the prevalence of COPD is directly related to the prevalence of tobacco smoking, although in many countries, outdoor occupational and indoor air pollution – the latter resulting from the burning of wood and other biomass fuels – are major COPD risk factors [2]. COPD is also a disease of increasing public health importance around the world. Estimates suggest that COPD will rise to the third most common cause of death worldwide by 2020 [1].

Exacerbations are episodic acute worsening of respiratory symptoms, including increased dyspnea and cough, wheezing and change in the amount and character of sputum. The frequency of exacerbations increases as airflow obstruction increases; patients with severe (FEV1 <50% predicted) or very severe (FEV1 <30%) airflow obstruction on average have one to three episodes per year. A variety of stimuli may result in increased symptoms that are characteristic of COPD exacerbations. Bacterial infection is involved in >50% of exacerbation [1]. It is estimated that bacterial infections are responsible for more than 40% of all exacerbations in India [3]. An exacerbation can contribute to irreversible progression of disease [4]. It has been found that use of antibiotics as well as type of antibiotics used to treat Acute Exacerbation of COPD (AECOPD) has an impact on the failure rate [5]. Proper selection of antibiotic selection needsculture studies but it is time consuming and not available in majority ofperipheral health institutions. Bacterial flora of AECOPD is changingfrom usual pathogen [6].

Knowledge of local bacterial pathogen in AECOPD helps in early introduction of proper empirical antibiotics which can reduce the morbidity, mortality andimprove prognosis particularly at peripheral level where facility forculture studies are not available. Hence the present study was planned to study the microbial pattern among the COPD patients during exacerbations.

MATERIAL AND METHODS

This is a retrospective study done at Department of General Medicine, MIMS, Mandya among patients admitted with acute exacerbation of COPD. 60 patients admitted with acute exacerbation are included in this study. Sputum culture reports obtained from case sheets from hospital record, data entered into MS Excel sheet and analysed.

RESULTS

60 patients were included in the study which comprised 48(80%) males and 12(20%) females having mean age of 58.16 years. Of the 60 patients microbial isolates were seen in 43.3% (26) cases. Among positive culture, Streptococcus pneumonia is the most common pathogen isolated in 38.46% cases followed by pseudomonas aeuroginosa (23.07%), klebsiella pneumonia (15.38%), staphylococcus aureus (7.6%), H. influenza (3.84%), E. coli (3.84%), and Acinetobacter (3.84%). Sputum AFB was positive in 3.84% (1 patient).

Streptococcus pneumonia which was the commonest isolate in the culture was sensitive to ceftriaxone - a third generation cephalosporin. Pseudomonas aeuroginosa was sensitive to piperacilin-tazobactum and amikacin, Klebsiella was sensitive to ceftriaxone but in one case resistant to ceftriaxone and sensitive to piperacilin-tazobactum, Staphlococcus Aureus was sensitive to ceftriaxone, linezolid, vancomycin. H influenza and E coli both were sensitive to ceftriaxone. AFB positive patient was Rifampicin sensitive detected by CBNAAT.

Table: Organisms and antibiotic sensitivity pattern

Bacterial organism	Percentage of culture positive	Sensitive antibiotic
Streptococcus pneumonia	38.46%	Ceftriaxone
Pseudomonas aeuroginosa	23.07%	Pipercillin-tazobactam
Klebsiella pneumonia	15.38%	Ceftriaxone
Staphylococcus aureus	7.6%	Ceftriaxone
H. influenza	3.84%	Ceftriaxone
E. coli	3.84%	Ceftriaxone
Acinetobacter	3.84%	Amikacin and Ceftriaxone
AFB	3.84%	ATT

DISCUSSION

COPD is leading cause of morbidity and mortality. Bacterial infections are considered to be most common cause of exacerbations in COPD. A Retrospective study was conducted to identify the common bacterial pathogen and sensitivity pattern in patients with exacerbation in our hospital. In our study microbial isolate seen in 43.3% which match similar studies by Dr Hariom sharan [7] (41.12%), Chawla *et al*., [3] (56%) and Madhavi *et al.*, 8(55%), whereas other study Patel AK *et al*., [9] (82%) shown higher positive culture which may be due to varying time of sputum collection in different studies.

Most common organism isolated in our study is Streptococcus pneumonia in 38.46% matches similar studies done by Sashibhusan BL *et al*., [10] (42%) and Patel AK *et al*., [9] (39%). Chawla *et al.*, [3] study had found pseudomonas was the common organism and in Madhavi *et al.*, [8] study Klebsiella was the commonest organism. This difference may be due to different area of studies.

Psedomonas aeuroginosa was isolated in 23.07% cases, matches with studies by Patel AK *et al*., [9] 25.95% and Priya N *et al*., [11] 10.1%. Klebsiella pneumonia was isolated in 15.38% cases whereas it was predominant isolate in study by Madhavi *et al*., [8].

Ceftriaxone is the most effective antibiotic in our study, as most of the cases the organisms isolated were sensitive to the same except pseudomonas which was resistant to ceftriaxone and sensitive to Piperacillin-tazobactam. Sashibhusan BL *et al*., [10] study also ceftriaxone was most effective antibiotic, wheras study done by Patel AK *et al*., [9] Piperacillin-tazobactam was most effective antibiotic.

CONCLUSION

In summary, Streptococcus pneumoniae is the predominantly isolated pathogen in patients with COPD presenting with exacerbation and Ceftriaxone is the most effective antibiotic in these patients as it was effective against most of the organisms causing exacerbation.

We conclude ceftriaxone should be the first line empirical antibiotic in patients with acute exacerbation of COPD.

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