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LOCAL PATTERN OF INFECTION IN PATIENT OF ACUTE EXACERBATION OF COPD ADMITTED AT SETH L.G. HOSPITAL AND AMC MET MEDICAL COLLEGE

General Medicine

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ABSTRACT

Background: Lower respiratory tract infections (LRTI) are the most frequent infections among patients of COPD admitted in intensive care units. The consequences of increased drug resistance are far reaching since bacterial infection is a major cause of death from infectious diseases.
Objective: To find local pattern of organism causing acute exacerbation of COPD and to ascess the drug resistance to the organism in patients of COPD in our region.
Methods and Materials: The study was conducted for the period of 6months from jan 2018 to June 2018 in the Medicine Department of SETH L.G.Hospital. The LRT specimens from 50 patients admitted in the ICU during the study period were processed. Following culture, the isolated organisms were identified and antimicrobial sensitivity was performed by standard methods.
Results: Out of the 50 LRT specimens evaluated, a total of 66 pathogens were recovered with a predominance of Gram-negative isolates (n = 63; 95.4%) Klebsiella pneumonia was the most dominant pathogen followed by Pseudomonas auerginosa. Markedly high percentage of extended spectrum beta-lactamase and methicillin resistant Staphylococcus aureus isolates were detected. The resistance to cephalosporins, aminoglycosides and carbapenem were noticable.
Conclusions: So that, we can conclude that for effective management of AECOPD, a detailed bacteriological diagnosis and susceptible testing is required to prevent global problem of antibiotic resistance.

KEYWORDS

Extended spectrum beta-lactamase(ESBL), lower respiratory tract infections(LRT), methicillin resistant Staphylococcus aureus(MRSA), acute exacerbation of COPD(AECOPD), gram negative bacilli(GNB), S= DRUG SENSITIVE; I=DRUG INTERMEDIATE; R=DRUG RESISTANT

INTRODUCTION:

Chronic obstructive pulmonary disease (COPD) is a progressive chronic disease which is characterised by an inexorable decline in respiratory function, exercise capacity, and health status.

COPD exacerbations are characterized by worsening cough, dyspnea, and sputum production beyond normal day-to-day variation. These are associated with acute deterioration of lung function during the exacerbation and may also accelerate the longitudinal loss of lung function.

Acute exacerbations of COPD are major cause of hospitalization, healthcare costs, morbidity and mortality in COPD.

Exacerbations have been associated with respiratory viral infections (rhino, RSV, influenza, adeno, metapneumovirus), bacterial infection, superinfections. The most frequent pathogens are Hemophilus influenza, Moraxella catarrhalis and Streptoccous pneumonia.

Severe air pollutions, especially particulates, sulphur dioxide, ozone, and nitrogen dioxide have been associated with elevated risk of hospitalization due to COPD.

The choice of antibiotic is determined by sensitivity & resistance patterns of likely pathogens prevalent in local area. Arterial blood gases and chest radiographs are useful for evaluating severity of acutely ill patients.

After initiation of empiric therapy, the antibiotic treatment should be tailored based on the organisms identified in sputum/respiratory secretions.

So we conducted this study to know the organisms & its sensitivity pattern predominantly causing AECOPD in our region, so that we can design effective empiric antibiotic regimen of initial treatment till culture sensitivity reports are obtained, which will have a beneficial effect on morbidity and mortality of the disease.

METHODS AND MATERIAL:

The present study was conducted in the Medicine Department of SETH L.G. Hospital during JAN 2018 to June 2018. The respiratory secretion samples like sputum, suction tip, endotracheal fluid, pleural fluid were obtained from the patients of known case of COPD presented with acute exacerbation and admitted in the ICU of the hospital.

The samples were collected aseptically and processed immediately following collection. Single or mixed growth (two or more than two isolates per specimen) isolated from all the eligible consecutive samples were identified by observing the colony characteristics on the blood agar, MacConkey agar plates and biochemical reactions using standard microbiological methods.

RESULTS:

During the study period, specimens of 50 patients who were admitted to ICU were evaluated. Out of 50 specimens (18 sputum, 18 suction tip, 10 tracheal and 4 pleural fluids), 48 (96%) specimens showed bacterial isolates while 2 (4%) specimens showed growth of Candida species also. A single pathogen was demonstrated in 46 (92%) patients and 04 (08%) had mixed bacterial etiology. A total of 66 isolates (including 2 Candida spp.) were recovered from 50 patients. Out of 66 bacterial pathogens recovered, 63 (95.45%) were Gram-negative and 03 (4.54%) were Gram-positive bacteria. The most prevalent Gram-negative pathogen isolated was Pseudomonas aeruginosa, which was isolated from 20 (40%) patients followed by Klebsiella pneumoniae (n = 17) (34%) while the most prevalent Gram-positive pathogen was Staphylococcus aureus (n = 2) (4%) followed by Streptococcus spp. (n = 1) (0.2%).

Among 63 Gram-negative bacteria 22 (34.92%) extended spectrum beta-lactamase (ESBL) isolates were recovered while out of both S. aureus (100%) were methicillin resistant(MRSA). High rates of resistance to cephalosporins (75.38%) were demonstrated by all the Gram-negative bacteria. The susceptibility rates for carbapenem were 75.13% followed by piperacillin+tazobactum (71.05%) and amikacin (60.45%). The percentage susceptibility of S. aureus and Streptococcus spp. towards vancomycin was 100% and 76%, while that for linezolid was 100% and 72.6% respectively.

DISCUSSION:

The main objective of this study was to investigate various isolates from AECOPD patients in ICU and to determine the antimicrobial resistance pattern of bacteria against some commonly used antibiotics. Ventilator associated respiratory infections continue to be a frequent

and fatal complication in critically ill patients. We found GNB to be the predominant organism (95.45%) with low isolation of S. aureus (3.03%). Among GNB, Klesiella pneumonia (39.68%) was the most common isolate.

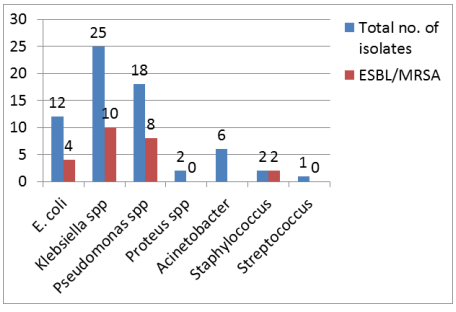
Advances in the medical and surgical manipulations and increase in their applications provide a suitable environment for nosocomial fungal infections. Though in the present study, Candida species was isolated in 2 (3.03%) patients, the cases should not be overlooked in future. There was an overall preponderance of GNB with P. aeruginosa, K. pneumoniae and E.coli as the common isolates. Incidence of mixed bacterial infection in this study was 08%, however, the identification of polymicrobial infections is very important for treatment strategies and to avoid a false impression of critically resistant strains.

Antibiotic resistance is a major problem in ICU admitted patients. We noticed a high rate of resistance to cephalosporins among the various Gram-negative isolates.

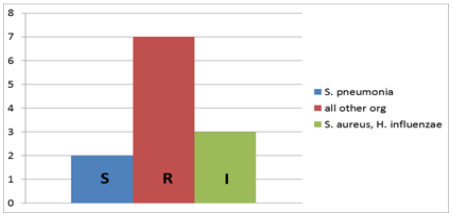
High rate of resistance at our hospital might be due to the selective influence of extensive usage of third generation cephalosporins. Carbapenems are frequently used as a last choice in treating serious infections caused by GNB's. Our study showed 24.87% resistance towards carbapenem which suggests that carbapenem should be judiciously used in ventilated patients to prevent any further increase in resistance.

The resistance of some GNB to aminoglycosides to a longer extent to gentamicin than to amikacin has been well-recognized in many hospitals. In this study, the resistance of Gram negative isolates toward amikacin and gentamicin which is again alarming. The causes behind the emergence of such organisms have been a matter of speculation. Due to high rate of progression of resistance to amikacin, a strategy of limited and prudent use of antibiotics is urgently needed. Aminoglycoside resistant strains are more common at sites with poor penetration of drugs. S. aureus is known to be a common cause of nosocomial lung infection.

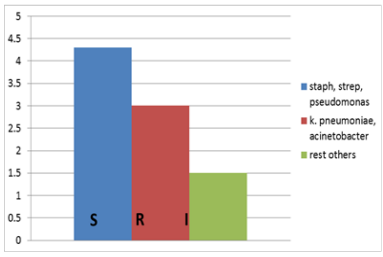
We conclude that multidrug resistant Pseudomonas and Klebsiella are the most common etiological agents of AECOPD in ICU. There is a markedly high rate of resistance to cephalosporins, beta lactam-beta lactamase inhibitors and carbapenem against predominant organism. The increasing resistance to antibiotics by respiratory pathogens has complicated the use of empirical treatment with traditional agents[24] and a definitive bacteriological diagnosis and susceptibility testing would, therefore, be required for effective management of LRTI. Now it is well known that critically ill and elderly patients are at greater risk of obtaining GNB-LRT infection. Antimicrobial resistance monitoring helps in optimization of antimicrobial therapy and is more important in the ICUs as infection and antimicrobial consumption are significantly higher.



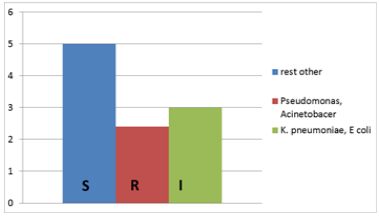
Penicillins and Cephalosporins



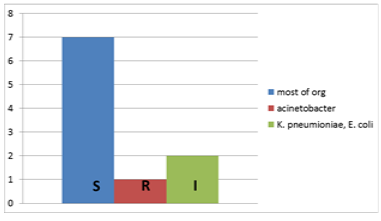
Aminoglycosides



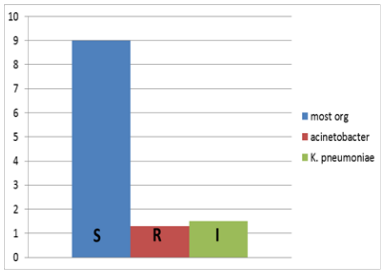
Fluoroquinolones



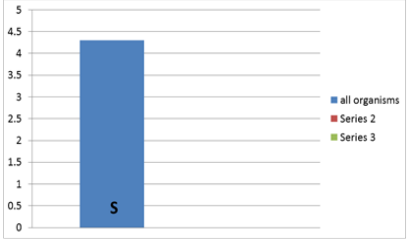
Combination penicillins (piperacillin+tazobactum)



Carbapenems & monobactums



Miscellaneous (Colistin, Polymyxin-B, Tigecycline)



CONCLUSION:

We can conclude that for effective management of AECOPD, a detailed bacteriological diagnosis and susceptible testing is required to prevent global problem of antibiotic resistance.

Klebsiella pneumonia is the most common pathogen in patients with AECOPD of this area and piperacilline+tazobactum is the most effective antibiotic against all organisms.

So, piperacilline+tazobactum should be the first choice empirical antibiotics for AECOPD patients in this area and Quinolones should be used cautiously because of high prevalence of tuberculosis.

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