AEROBIC BACTERIAL PROFILE AND ANTIBIOTIC SENSITIVITY OF BRONCHOALVEOLAR LAVAGES IN PULMONARY INFECTIONS AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: Lower respiratory tract infections (LRTIs) are one of the commonest clinical problems in community and hospital settings and the commonest causes of morbidity and mortality. Early diagnosis and proper choice of antibiotics are crucial for the management and to prevent emergence of multidrug-resistant pathogens. Successful treatment of pulmonary infections depends on the accurate identification of the precipitating pathogen. Microscopic examination and culture of expectorant is the mainstay of laboratory evaluation. Contamination with oropharynx secretions is a frequent issue. If sputum evaluation fails to identify causative factors, definitive identification is required for successful patient treatment [1]. Bronchoalveolar lavage (BAL) is a diagnostic procedure by which cells and other components from bronchial and alveolar spaces are obtained for various studies. Materials obtained by BAL can give a definite diagnosis in conditions such as infections and malignancies [2]. In pulmonary infections, Bronchoalveolar lavage (BAL) fluid sample has high sensitivity and reliability in diagnosis. This study is carried out to determine the distribution of bacterial isolates in BAL samples and antibiotic sensitivity patterns in most frequently isolated bacterial pathogens other than Mycobacterium tuberculosis.

INTRODUCTION

Lower respiratory tract infections (LRTIs) are infections of the airways below the level of Larynx, including the Trachea, Bronchi, Bronchioles and Alveoli. LRTIs are one of the common clinical problems in community and hospital settings and the commonest causes of morbidity and mortality. Early diagnosis and proper choice of antibiotics are crucial for the management and to prevent emergence of multidrug-resistant pathogens. The successful treatment of pulmonary infections depends on the accurate identification of the precipitating pathogen. Microscopic examination and culture of expectorant is the mainstay of laboratory evaluation. Contamination with oropharynx secretions is a frequent issue. If sputum evaluation fails to identify causative factors, definitive identification is required for successful patient treatment [1]. Bronchoalveolar lavage (BAL) is a diagnostic procedure by which cells and other components from bronchial and alveolar spaces are obtained for various studies. Materials obtained by BAL can give a definite diagnosis in conditions such as infections and malignancies [2]. In pulmonary infections, Bronchoalveolar lavage (BAL) fluid sample has high sensitivity and reliability in diagnosis. This study is carried out to determine the distribution of bacterial isolates in BAL samples and antibiotic sensitivity patterns in most frequently isolated bacterial pathogens other than Mycobacterium tuberculosis.

MATERIALS AND METHODS

Study was conducted on BAL samples received in the microbiology laboratory, Andhra medical college from various wards of King George Hospital in over a period of one year (from January 2022 to December 2022). All samples were processed according to standard microbiology protocols. Antimicrobial susceptibility was tested by the Kirby-Bauer disc diffusion method as per the CLSI guidelines 2022.

RESULTS

Total 218 BAL samples were studied. Among 218 BAL samples, 144 (66%) samples were from male patients and 74 (34%) samples from female patients. Out of 218 samples, 119 (55%) were culture positive and 99 (45%) were culture negative. Majority of cases were in the age group 41-60 y. Among 119 bacterial isolates, Gram-negative bacilli were more commonly isolated in BAL samples and the bacterial isolates were most sensitive to Piperacillin-Tazobactam (74.3%) followed by Meropenem (71.7%), Amikacin (60.6%) and least sensitive to Cefotaxime (39.3%) and Ceftriaxime (37.6%).

Conclusion: The present study shows that gram-negative bacilli were more commonly isolated in BAL samples and the bacterial isolates were most sensitive to Piperacillin-Tazobactam and Meropenem and highly resistant to Cefotaxime and Ceftriaxime. Hence, formulating a regular antibiotic in hospitals will help in developing local antibiotic policies, which may provide better patient management and judicious use of antibiotics by clinicians to prevent the risk of the emergence of multidrug-resistant pathogens.

Keywords: Infections, Isolates, Bacterial, Bronchoalveolar, Antibiotic

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DISCUSSION

Pulmonary infections are among the most common infectious diseases worldwide, which account for significant mortality and morbidity. BAL can be very useful in the diagnosis of pulmonary infections. In this study, 119 (55%) BAL fluid samples showed bacterial growth. These results similar to other studies done by Padmaja et al. [3] (58%), Radha et al. [2] (42%).

Among GNB isolates, Klebsiella pneumoniae (43%) was the predominant pathogen, followed by Pseudomonas aeruginosa (39%) and Escherichia coli (9%), which is correlating with studies of Padmaja et al. [3], Radha et al. [2]; Bari et al. [4], Vishwanath et al. [8], Regha et al. [9], Ghanem et al. [10], Supriya Panda et al. [11], Ramana KV et al. [12], Syed Mustaq Ahmed et al. [13], Ravichitra KN et al. [14] while in Duan et al. [15] Pseudomonas aeruginosa was the predominant pathogen (table 1).

The GNB isolates were highly sensitive to Piperacillin-Tazobactam (74%), followed by Meropenem (72%), Amikacin (61%), Ciprofloxacin (55%), and least sensitive to Ceftazidime (39%) and Cefotaxime (38%) which is correlating with studies of Magazine et al. [7] and Padmaja et al. [3].
CONCLUSION

The present study shows that gram-negative bacilli were more commonly isolated in BAL samples, which were most sensitive to Piperacillin-Tazobactam and Meropenem and highly resistant to Cefotaxime and Ceftazidime. Hence, formulating a regular antibiogram in hospitals will help in developing local antibiotic policies, which may provide better patient management and judicious use of antibiotics by clinicians to prevent the risk of the emergence of multidrug-resistant pathogens in near future.

AUTHORS CONTRIBUTIONS

First author of the study M Srivalli contributed conceptual design, literature search, collected the data. The second author contributed data analysis, statistical analysis and wrote the first draft of the manuscript. The third author P Ratna Kumari guided the work and corrected the manuscript. The fourth author P Kamala contributed in drafting the manuscript.

ACKNOWLEDGEMENT

Nil

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICTS OF INTERESTS

The study declared ‘no conflicts of interest.’

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