

Review Article

Management of lower respiratory tract infections (LRTI's): clinical microbiologists' perspective

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ABSTRACT

In the era of emergence and re-emergence of newer and existing microorganisms, clinical and laboratory diagnosis of LRTI's requires regular evaluation. Elaborating on possible predisposing factors will be critical to health care workers in the better management of patients suffering with Lower Respiratory Tract Infections (LRTI's). Microbiologist's role becomes crucial in deciding the culture methods to be employed to isolate the suspected causative microorganism and identification of the probable pathogen among mixed growth of the isolated bacteria/fungi. Antimicrobial therapy should necessarily be guided by the susceptibility patterns of various antibiotics against different microorganisms from a given geographical region, which should be regularly updated.

Keywords: Lower Respiratory Tract Infections (LRTI's), Diagnosis of LRTI's, Patient management

INTRODUCTION

Lower respiratory tract infections (LRTI's) are among the most predominant causes of severe morbidity and mortality arising from infectious diseases both in developed and developing nations. A recent WHO report indicates that LRTI's account for 20% of the mortality among various infectious agents in Indian population.¹ Elaborating on possible predisposing factors will be critical to health care workers in the better management of patients suffering with Lower Respiratory Tract Infections (LRTI's). Children born to anaemic/malnutrition mothers, pre-term babies, low-birth weight, genetic disorders, birth anomalies and overcrowding are more predisposed to LRTI's.² Factors contributing to adult LRTI's include smoking, chronic obstructive pulmonary disease (COPD), cystic fibrosis, major surgical intervention (transplantation), cancer patients and geriatric age group. Acute viral respiratory tract infections may also lead to inflammation,

compromise of the air way and results in bacterial colonization and infection.^{3,4}

ROLE OF CLINICAL MICROBIOLOGY LABORATORY IN DIAGNOSIS AND MANAGEMENT OF LRTI's

Role of clinical laboratories and microbiologists in the better management of LRTI's should be to emphasize on the need for quality specimens in the diagnosis of LRTI's as most samples are contaminated by oropharyngeal flora and that the causative microorganism can be a bacterium, fungi or a virus.⁵ Microbiologist's role becomes crucial in deciding the culture methods to be employed to isolate the suspected causative microorganism and identification of the probable pathogen among mixed growth of the isolated bacteria/fungi.⁶⁻⁸ A previous communication has opined that broncho-alveolar lavage (BAL) and induced sputum must be specimen of choice to reduce the negative results from the regular sputum sample.⁹ Report

of a recent study also has indicated that an education package for staff on when and how to collect appropriate sputum samples has improved the reliability of culture results and reduced the workload and cost.¹⁰ Identification of the possible pathogen remains the most significant aspect of laboratory diagnosis of LRTI's due to the presence of colonized bacteria. Performance of a clinical microbiology laboratory in the diagnosis and management of LRTI's can be improved with communication between Laboratory specialists, infectious diseases physician, pulmonologists and specialists attending cancer patients, transplants and immunocompromised patients.¹¹ Physicians treating the patients with LRTI's should carefully consider both the benefit and harm that may arise from the use of antibiotics.¹² Antimicrobial therapy should necessarily be guided by the susceptibility patterns of various antibiotics against different microorganisms from a given geographical region, which should be regularly updated.¹³ It has been noted that specific recommendations on the clinical diagnosis of LRTI's (community/hospital acquired) and the probable methods of diagnosis and treatment will certainly help in better patient management.¹⁴

MICROBIOTA OF LOWER RESPIRATORY TRACT

It has been noted that the study of bacterial load in lower respiratory tract may be helpful in future in the management of acute exacerbations of LRTI's.¹⁵ A recent study among patients suffering from tuberculosis has also noted the presence of anaerobic microbiota colonized in the respiratory tract. A recent study has elaborated on the need to have human microbiome project (HMP), that can be used to improve human health through monitoring and manipulating the human microbiome (genome collection of microorganisms in human).¹⁶ The occurrence of potentially pathogenic microorganisms (PPM) and non-potentially pathogenic microorganisms (non-PPM's) in the lower respiratory tract of both healthy and debilitated individuals should be taken in to consideration in the better management of LRTI's.¹⁷

JUDICIOUS USE OF ANTIMICROBIALS FOR TREATING LRTI's

Improved nutrition, timely immunization, appropriate early diagnosis and treatment of LRTI's and detection of treatment failure and recurrence will facilitate future prevention of LRTI's.¹⁸ With increasing burden of tuberculosis and other respiratory tract infections (RTI's), studies have recommended the use of fluoroquinolones as treatment of choice for LRTI's and others have argued against this predicting resistance.¹⁹ Use of amoxicillin as an empirical therapy for the management of LRTI's has noted that in the absence of invasive infection it has no benefit.²⁰ Antibiotic prescribing policies specific for an institution/region against various LRTI's is recommended. A recent study by Brookes-Howell L et al

from United Kingdom has elaborated the on the clinician's accounts of clinical influences on antibiotic prescribing decisions for LRTI's.²¹

CONCLUSION

Management of lower respiratory tract infections assumes greater significance in the public health perspective. In the era of emergence and re-emergence of newer and existing microorganisms, clinical and laboratory diagnosis of LRTI's requires regular evaluation. Prevalence of multi-drug resistance and occurrence of nosocomial LRTI's should be considered as a cause of concern. Data on the possible indicators for clinical diagnosis, aetiology related to specific condition, possible predisposing/contributing factors and antimicrobial susceptibility profile of the causative micro-organisms with respect to the specific geographical regions must be used to formulate guidelines for better management of LRTI's.

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