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Original Article

A study to detect the Prevalence of Mycoplasma pneumoniaeInfections at Teritary care center, Hubballi, North Karnataka

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ABSTRACT

Introduction: Mycoplasma pneumoniae is a common and important pathogenic cause of community-acquired pneumonia presenting with fever and respiratory symptoms of varied severity. Therefore, laboratory diagnostic methods are particularly important for the diagnosis and treatment of atypical pneumonia. A study was conducted to determine the significance of this association and to estimate the prevalence of Community Acquired Mycoplasma Pneumonia by detecting IgM antibodies of Mycoplasma pneumoniae in the serum of patients attending the KMCRI OPD, Hubballi with complaints of fever and respiratory symptoms.1Methods: Serum samples of 82 patients were collected and tested for Mycoplasma pneumoniae IgM antibodies by using commercially obtained (Calbiotech) Mycoplasma pneumoniae IgM ELISA kit. Results: Out of 82 serum samples tested for Mycoplasma pneumoniae-specific immunoglobulin M (IgM), 10 were positive accounting to 12.19%.
Conclusion: Detection of IgM antibodies by ELISA for Early and reliable diagnosis of Mycoplasma pneumoniae infections during the acute phases of disease helps in starting Organism specific treatment.

Keywords: *Atypical pneumonia, ELISA, Mycoplasma pneumoniae.*

INTRODUCTION

Mycoplasma pneumoniaeis a common respiratory pathogen that produce diseases of varied severity ranging from mild upper respiratory tract infection to severe atypical pneumonia. Although rarely fatal, M. pneumoniae is an important cause of acute respiratory tract infection, especially as a potential aetiology of the clinical entity termed “atypical pneumonia.3

The atypical respiratory bacterial pathogensMycoplasma pneumoniae, Chlamydiapneumoniae and Legionella pneumophila are now recognised as a significant cause of acute respiratory-tract infections, but they remain colourless after Gram-staining and are difficult to identify by conventional bacterial culture tests. It is reported that patients with atypical pneumonia were more likely to have normal or reduced white bloodcell counts.However some published data showed that between atypical pneumonia and general bacterial pneumonia, there were no significant differences in symptoms such as fever, cough, productive sputum and the sign of lung rales. Commonly prescribed antibiotics like beta- lactams are not effective for against Mycoplasama pneumonia. Therefore, laboratory detection methods in diagnosis and treatment of atypical pathogenic infection is particularly important4.As most infections occur among outpatients hence the colloquial term walking pneumonia..So the present study is undertaken to know the prevalance of infection caused Mycoplasma pneumoniae and age susceptibility in patients attending the OPD of KMCRI, Hubballi.

METHODS

Study Design and Patients

Under strict aseptic precautions, serum samples of 82 patients were collected in the KMCRI OPD, Hubballi, Karnataka and a prospective study was conducted. All sera were tested for Mycoplasma pneumoniae IgM antibodies by using Mycoplasma pneumoniae IgM ELISA kit from Calbiotech. Test on all individual specimens were performed on the same day.

Inclusion Criteria
Patients attending KMCRI OPD, Hubballi with complaints of fever for more than 5-7 days.
Patients attending KMCRI OPD, Hubballi with respiratory complaints.

Exclusion Criteria
Patients diagnosed with other causes of fever.

The Mycoplasma pneumoniae IgM antibodies were evaluated with Calbiotech IgM ELISA kit. Positive and Negative results were determined by the cut-off values. Each run was validated with the positive and negative controls included in the kits.The results were expressed as an Antibody index (Ab index), calculated as the ratio of sample optical density to cut-off serum mean OD (0.844). The cut-off value was calculated as the product of Calibrator mean OD (1.8775) and Calibrator factor (0.45). The indices below 0.9 were considered negative for IgM specific Antibodies, those above 1.1 were considered positive and those from 0.9-1.1 were considered borderline positive.

RESULTS AND DISCUSSION
A total of 82 patients were tested for the presence of Mycoplasma pneumoniae IgM. Of this total, 2 were positive between 0 and 10 years of age, 7 were positive between 11 and 20 years of age and 1 was positive between 41 and 50 years. Subjects were grouped into following age categories (in years): 0-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80 (Table – 1). IgM antibodies were detected in 0% to 12.19% in these groups; the positive rate was higher in children, adolescents and young adults.Results showed highest positive IgM reactivity in the group aged 11-20 years. Overall IgM positive levels were 12.19% with Calbiotech Mycoplasma pneumoniae IgM ELISA kit.

Many bacterial and viral infections often share clinical features and symptoms which are difficult to distinguish clinically. Typical clinical features of Mycoplasma pneumoniae include pharyngitis, sore throat, hoarseness and fever. In children under 5 years of age progression to pneumonia is uncommon. Whereas children under 5-15 years of age are likely to develop bronchopneumonia requiring hospitalisation. Apart from respiratory infections it can also cause a wide spectrum of non-pulmonary manifestations like neurological, hepatic, cardiac, hemolytic anaemia and polyarthritis. Of the non-pulmonary manifestations, neurological manifestations are common.

In our study, overall IgM positive levels were 12.19%. Majority (8.53%) of the cases were found in the age group of 11-20 years. Two cases (2.43%) were positive under the age group of 10 years. Only one case (1.21%) was positive in the adult age group of 41-50 years showing concurrence with other studies.3

Hence a sensitive and effective method of detecting these agents is required so that the correct treatment is offered and unnecessary use of antibiotics can be avoided.5 Several commercial M. pneumoniae antibody detection kits that use PAAA or EIA are available to identify M. pneumoniae in human sera. Among the various immunoassays, EIAs are the most widely used in clinical laboratories6.

Table.1 Test Results of M.Pneumoniae Igm-Specific Immunoassays by Age

Age (Years)	Negative	Equivocal	Positive
0-10	15 (18.29%)	0 (0.0%)	2 (2.43%)
11-20	17 (20.73%)	0 (0.0%)	7 (8.53%)
21-30	20 (24.39%)	0 (0.0%)	0 (0.0%)
31-40	10 (12.19%)	0 (0.0%)	0 (0.0%)
41-50	5 (6.09%)	0 (0.0%)	1 (1.21%)
51-60	2 (2.43%)	0 (0.0%)	0 (0.0%)
61-70	1 (1.21%)	0 (0.0%)	0 (0.0%)
71-80	2 (2.43%)	0 (0.0%)	0 (0.0%)
Total	72(87.8%)	0 (0.0%)	10 (12.19%)

One study from France suggested that positive IgM and IgG results varied according to the kit used and the age of the patients7.Our study also demonstrated that age had a major influence on the fraction of positive sera (Table 1). The highest IgM-positive rate occurred in the age group of 11-20 years.

In this age group the manifestatons of M.pneumoniae are more severe like bronchopneumonia of one or two lobes.This suggests strongly that single-IgM measurement may be helpful in effort towards early diagnosis of M. pneumoniae infection among cases of community acquired pneumonia. There by ensuring correct treatment and preventing progression of the disease to severe complication like bronchopneumonia. Therefore, serological test like ELISA should be considered for diagnosing M.pneumoniae infection in its early phase especially in patients of 11-20 year age group6.

The present study highlights the importance of incorporating serological testing, specifically IgM antibody detection by ELISA, for the early and accurate diagnosis of Mycoplasma pneumoniae infections in patients presenting with fever and respiratory symptoms. Given the notable prevalence of 12.19% observed, particularly among the 11-20 years age group, it is recommended that healthcare providers at tertiary care centers prioritize this diagnostic approach to facilitate timely and organism-specific treatment. Early identification of M. pneumoniae can prevent the misuse of broad-spectrum antibiotics, reduce disease progression, and mitigate complications such as bronchopneumonia. Furthermore, routine screening using sensitive and specific ELISA kits should be integrated into clinical protocols for patients with community-acquired pneumonia, especially in outpatient settings where atypical presentations are common. This will support targeted therapy, improve patient outcomes, and contribute to antimicrobial stewardship. Continued surveillance and larger-scale studies are also advised to monitor prevalence trends and validate the diagnostic utility of IgM ELISA across different age groups and clinical settings.

The present study has several limitations that should be considered when interpreting the findings. First, the sample size of 82 patients is relatively small, which may limit the generalizability of the prevalence rate observed to a broader population. Second, the study was conducted at a single tertiary care center in Hubballi, North Karnataka, which may not fully represent the epidemiological patterns of Mycoplasma pneumoniae infections in other geographic regions or healthcare settings. Third, the reliance on a single serological method, IgM antibody detection by ELISA, while sensitive and specific, may miss cases in the early window period before antibody production or in patients with atypical immune responses. Additionally, the cross-sectional design did not allow for follow-up testing to confirm acute infection or to detect seroconversion, which could strengthen diagnostic accuracy. Furthermore, clinical data on symptom severity and co-infections were limited, restricting the ability to correlate seropositivity with clinical outcomes comprehensively. Finally, the exclusion of patients with other causes of fever may have introduced selection bias, potentially underestimating the true prevalence of Mycoplasma pneumoniae in the community-acquired pneumonia population.

CONCLUSION

The present study has shown that, serological test such as, detection of IgM antibodies by ELISA for precise and reliable diagnosis of Mycoplasma pneumoniae infections during the acute phases of disease is necessary to start organism specific treatment.The present study demonstrates a Mycoplasma pneumoniae IgM antibody prevalence of 12.19% among patients presenting with fever and respiratory symptoms at a tertiary care center in Hubballi, North Karnataka. The highest positivity was observed in the 11-20 years age group, indicating increased susceptibility in adolescents and young adults. These findings underscore the relevance of serological testing, particularly IgM ELISA, for early and accurate diagnosis of M. pneumoniae infections. The study confirms that timely identification of this atypical pathogen can guide organism-specific treatment, reducing unnecessary use of broad-spectrum antibiotics and preventing disease progression to complications such as bronchopneumonia. Overall, the present study highlights the clinical significance of incorporating sensitive serological assays into routine diagnostic protocols for community-acquired pneumonia, especially in outpatient settings. This approach supports improved patient management and antimicrobial stewardship, contributing valuable epidemiological insight into the regional prevalence of M. pneumoniae infections.

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