Clinical Analysis of Mycoplasma Pneumoniae in Children: A Case Series

ABSTRACT

Mycoplasma pneumoniae is a common cause of community-acquired pneumonia in children, often presenting with varied clinical manifestations ranging from mild respiratory symptoms to severe pneumonia and extrapulmonary complications. Diagnosis of *Mycoplasma pneumoniae* is often challenging and controversial, due to limited understanding of its clinical presentation.

We included four cases of *M pneumoniae* from a period of September 2024 to November 2024, all of which were confirmed by a respiratory panel. Clinical manifestations include fever, persistent cough and with normal white blood cells, elevated CRP. Cold agglutination test was positive. Radiologic findings also account for pneumonia features. In all cases treatment response is obtained with macrolides and fluoroquinolones.

Mycoplasma infections are mostly asymptomatic, but can lead to more serious complications. This condition is also underdiagnosed due to its nonavailability of rapid and easy diagnostic methods. This case series emphasizes the importance of early detection and treatment can reduce complications , hospitalizations and improve patient outcomes.

There's no vaccine to prevent this infection. Healthcare providers generally don't prescribe antibiotics after exposure to help prevent someone from getting an *M. pneumoniae* infection. However, there are steps people can take to help protect themselves, *M. pneumoniae* and other respiratory pathogens can be stopped from spreading by covering coughs and sneezes and washing your hands.

KEYWORDS: Mycoplasma pneumoniae (MP), Respiratory panel ,fluoroquinolones, parapneumonic effusion

INTRODUCTION

Mycoplasma pneumoniae (M. pneumonia) is a significant cause of community-acquired pneumonia (CAP) in both children and older adults, with the highest prevalence observed in school-aged children between the ages of 5 and 15.[1]The smallest self-replicating biological system, *Mycoplasma pneumoniae (MP),* is frequently responsible for upper and lower respiratory tract infections, which can result in a variety of pulmonary and extrapulmonary symptoms.[2]*Mycoplasma pneumoniae pneumonia (MPP),* also known as "walking pneumonia," is a mild, unusual illness with a range of clinical manifestations. [3]Since it is a small rod without a cell wall, the Gram stain cannot see it. Serum-supplemented media can be used to isolate it. Nevertheless, isolation is typically not carried out in clinical laboratories because of its meticulous nature. Its growth is slow and necessitates a specific cultural medium. For these reasons, it is not regularly cultivated. Since the organism is expelled from the respiratory system

after several weeks of acute infection, isolation of the organism is not time-specific.[4] Sore throat, hoarseness, fever, cough (may be purulent), headaches, coryza, earache, myalgias, chills, and general malaise are among the usual symptoms that appear over a period of days and last for weeks to months.[5]

In addition to respiratory tract infections, this organism can cause a variety of non-pulmonary symptoms, such as haemolytic anaemia, polyarthritis, erythema multiforme, neurological, hepatic, and cardiac disorders. Of these non-pulmonary symptoms, neurological symptoms are believed to be the most prevalent. The stimulation of inflammatory cytokines is a part of *M pneumoniae* pathogenesis. Because of its gliding motion and particular tip organelles, *M pneumoniae* can burrow between cilia in the respiratory epithelium, causing the respiratory epithelial cells to slough off. [6]

Serological techniques, especially enzyme-linked immunosorbent assays (ELISAs), are the most commonly employed methods for diagnosing M. pneumoniae infections. The definitive diagnostic criteria for M. pneumoniae infection are typically regarded as seroconversion or an increase in IgG titers. However, the interpretation of antibody results can be influenced by the age and immune status of children, particularly due to challenges in acquiring convalescent serum[7,8]

Effective treatment of *M pneumoniae* depends on an early and accurate diagnosis. In this case series, we discuss the clinical signs, diagnosis, and treatment of *M. pneumoniae.*

CASE PRESENTATION

CASE 1

- A 10yr old male was admitted with complaints of cough for 7 days, wet cough. Child then started a fever for 7 days, high grade, intermittent associated with chills and relieves on medication. It was associated with running nose and evaluated with necessary investigations and serum CRP was found to be elevated 182.9mg/L. Sputum culture and blood culture showed no growth of any microorganisms. Mantoux test was done, negative. He was provisionally diagnosed with a case of Right lower zone and mid zone pneumonia and was managed with IV Piperacillin +Tazobactam given for 3 days, IV Amikacin for 5 days, Oseltamivir for 5 days, nebulization, multivitamins, adequate hydration and other supportive care. Fever and cough are not controlled with the medications given and antibiotics upgraded to IV meropenem given for 7 days. In spite of persistent fever and cough along with chest pain antibiotics were upgraded to Vancomycin given for 3 days. USG chest showed lung consolidation with stage of hepatization and mild pleural effusion on right side. Pulmonology consultation was sought and advice followed and Respiratory panel done, detected Mycoplasma pneumoniae and Rhinovirus. Child was started Clarithromycin given for 7 days. IV levofloxacin was started, given for 10 days Child became clinically better, chest pain improved. Repeated USG showed improvement in consolidation of minimal pleural effusion on the right side. The child became better with the treatment.

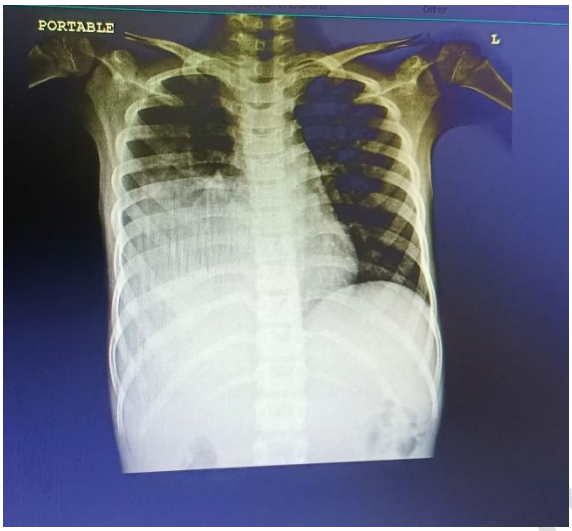

Fig 1. Chest x-ray showing right lower lobe pneumonia of case 1

CASE 2

- An 8yr old female child with fever, which was high grade, not relieving on medication, multiple spikes per day. Child had vomiting for 4 days, multiple episodes contained food. cough was dry type with throat pain. Child was evaluated with necessary investigations, serum CRP was elevated ,80.9mg/L and there was no bacterial growth in blood culture. In view of persistent fever, a respiratory panel was done and showed mycoplasma. He was provisionally diagnosed as case of Right lower zone pneumonia and was managed with IV Cefuroxime for 2 days then upgraded to IV Tazact given for 2 days, oseltamivir for 5 days, nebulization, multivitamins, adequate hydration and other supportive medications. USG chest showed consolidation with synpneumonic effusion. In view of synpneumonic effusion iv Tazact was changed to iv levofloxacin and clarithromycin given for 5 days. The child becomes symptomatically improved.

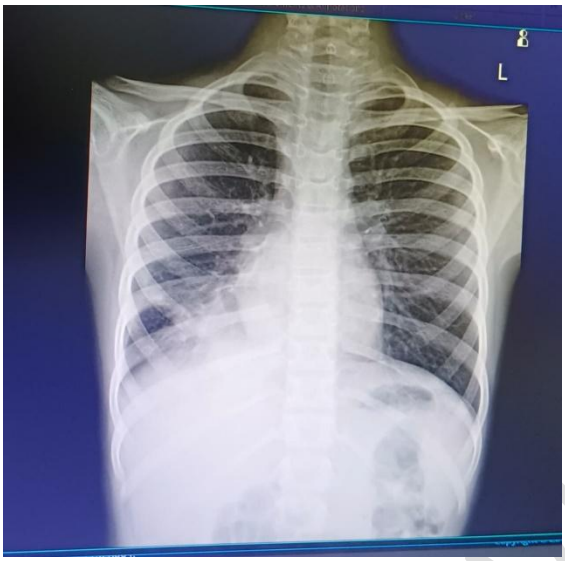

Fig 2. Chest x-ray showing right lower lobe pneumonia of case 2

CASE 3

- A 5yr old female baby was admitted with complaints of lowgrade fever for 3 days and cough for 3 weeks and was evaluated with necessary investigations. She was provisionally diagnosed as a case of LRTI and was managed with Clarithromycin for 4 days, nebulization, multivitamins, adequate hydration and other supportive medications Respiratory panel taken showed coronavirus NL63, mycoplasma and RSV-A+B. The child became better with the treatment.

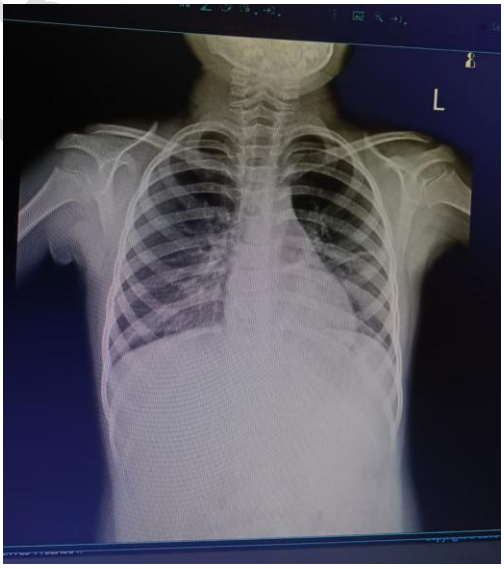

Fig 3. Chest x-ray showing left lower lobe pneumonia of case 3

CASE 4

- A 10 yr. old female child was admitted with complaints of fever for 5 days She was provisionally diagnosed as case of Left lower zone pneumonia and was managed with IV Cefuroxime for 2 days, Azithromycin for 5 days, nebulization, antipyretics, multivitamins, adequate hydration and other supportive medications In view of persistent fever, respiratory panel done showed Mycoplasma and human metapneumovirus. IV Cefuroxime was changed to IV Levofloxacin given for 7 days. The child became better with the treatment.

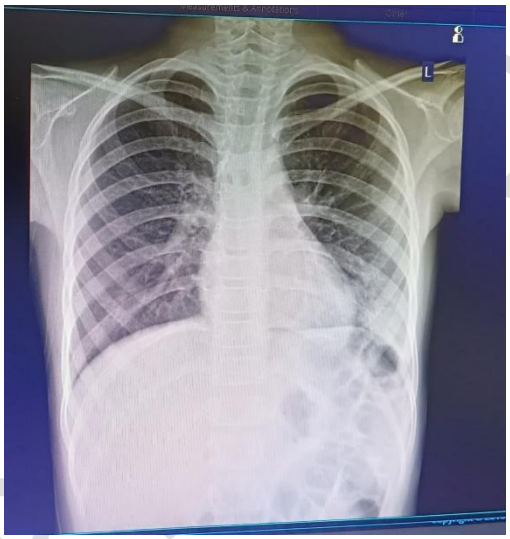

Fig 4. Chest x-ray showing left lower lobe pneumonia of case 4

DISCUSSION

The prevalence of MPP is underestimated, since most patients infected with MP usually are asymptomatic and rarely seek medical attention. MP is a common etiology for CAP. MPP is often called “walking pneumonia” because of its presumed benign nature. Fulminant MPP accounts for 0.5–2% of cases, commonly among healthy, young individuals. Pulmonary complications like parapneumonic effusions are rare and occur mainly in children or adolescents; most cases are unilateral, low-volume, and resolve with antimicrobial therapy. Diagnosing MPP is difficult especially since radiographic findings can be variable.

In the case report of Ateeq mubarik et al.. Pulmonary complications like parapneumonic effusions are rare and occur mainly in children or adolescents; most cases are unilateral, low-volume, and resolve with antimicrobial therapy, in our cases also presence of pleural effusions is found.[9]

Although blood culture is commonly used for detecting infections, it is not a reliable method for diagnosing Mycoplasma pneumoniae. In the case series of Hasina maredia et al.. Mycoplasma serologic results were collected(CRP, Total Count, ESR, RT-PCR) for M. pneumoniae would have provided further specificity. However, RT-PCR was performed for HSV to rule out the most likely alternative differential diagnosis. In our cases mycoplasma detected through respiratory panel.[10]

In case report of Bhimana Vaishnavi et al.. Chest X-ray showed right lung consolidation with pleural effusion There was decreased air entry in right hemithorax and trachea pushed to left side. Clinical diagnosis of right complicated pneumonia was made, that was similar to our cases.[11]

In the case report of Athira Unni et al the patient had a positive cold agglutinin test and showed characteristic autopsy findings. Significant clinical findings are seen in those patients with consolidation. High index of suspicion is needed in diagnosing MP as radiographic findings can be variable and seen in other conditions too. A conclusive diagnosis of Mycoplasma pneumoniae infection necessitates both serological analysis and direct detection of the pathogen. Serological assessments, such as those measuring IgM and IgA antibodies, can suggest a current or recent infection, while direct detection methods, including PCR or culture, can verify the presence of the bacteria. [12] Due to its lack of a cell wall, MP cannot be identified on gram stain and due to the same reason, they are insensitive to beta-lactam antibiotics. In our cases also diagnosed by respiratory panel, serological test was positive for cold antibody. Initially, our cases were insensitive to beta-lactam treatment similar to their cases.[13]

In these cases, the use of empirical treatment followed by targeted therapy based on diagnostic results helped improve patient outcomes. The most common chest x-ray findings are a reticulonodular pattern or patchy areas of consolidation; these can be unilateral or bilateral and are more prominent in the lower lobes.

Parameter	**Case 1 (10y Male)**	**Case 2 (8y Female)**	**Case 3 (5y Female)**	**Case 4 (10y Female)**
Symptoms	Wet cough (7d), fever (7d), chills, chest pain	High-grade fever, vomiting (4d), dry cough, throat pain	Low-grade fever (3d), cough (3 weeks)	Fever (5d)
CRP	182.9 mg/L	80.9 mg/L	Not specified	80.4 mg/dl
TC	5500 cells/mm	5900 cells/mm	11000 cells/mm	7300 cells/mm
Culture Results	Blood/sputum: No growth	Blood culture: No growth	Not mentioned	Not mentioned
Mantoux Test	Negative	Not done	Not done	Not done

Cold agglutination test	Positive	Positive	Positive	Positive
Chest X-ray	Right lower + mid zone pneumonia	Right lower lobe pneumonia	Left lower lobe pneumonia	Left lower lobe pneumonia
USG Chest Findings	Consolidation, hepatization, mild pleural effusion (R)	Consolidation with synpneumonic effusion	Not mentioned	Not mentioned
Respiratory Panel	Mycoplasma pneumoniae, Rhinovirus	Mycoplasma	Coronavirus NL63, Mycoplasma, RSV-A+B	Mycoplasma, Human Metapneumovirus A+B
Initial Antibiotics	Piperacillin + Tazobactam (3d), Amikacin (5d), Oseltamivir(5d)	Cefuroxime (2d), Oseltamivir(5d)	Clarithromycin (4d)	Cefuroxime (2d), Azithromycin (5d)
Antibiotic Escalation	Meropenem (7d), Vancomycin (3d)	Tazact (2d), then changed to Levofloxacin + Clarithromycin	None	Changed to IV Levofloxacin (7d)
Macrolide Use	Clarithromycin (7d)	Clarithromycin (5d)	Clarithromycin (4d)	Azithromycin (5d)
Quinolone Use	IV Levofloxacin (10d)	IV Levofloxacin	None	IV Levofloxacin (7d)
Outcome	Symptomatic improvement, reduced effusion	Symptomatic improvement	Symptomatic improvement	Symptomatic improvement

Table1: clinical features and therapeutic inventions in the case series

CONCLUSION

Managing pediatric pneumonia due to *Mycoplasma pneumoniae* is challenging, especially when the diagnosis is delayed. In the presented cases, children experienced prolonged hospital stays and required multiple changes in antibiotics due to initially unclear diagnoses. Chest X-ray findings commonly showed lower lobe consolidations and pleural effusions, helping to support a diagnosis of pneumonia . While respiratory panels eventually identified Mycoplasma and viral co-infections, their high cost and limited availability make them less practical in many settings. This highlights the need for more accessible alternatives like PCR or serology. Often, a clinical diagnosis based on history, physical examination, and basic tests (CRP, CBC, imaging) is sufficient to begin empirical treatment with macrolides or antivirals. These cases emphasize the importance of balancing cost, diagnostic accuracy, and timely intervention. Early diagnosis, supportive care, and

appropriate antibiotics guided by both clinical features and imaging are crucial to improving outcomes in children with Mycoplasma pneumonia.

LIMITATION OF THE STUDY

In our study, diagnosis is done by respiratory panels was accurate but costly and not easily accessible in all healthcare settings.

CONSENT

The author has obtained written consent from patients to conduct the study.

DISCLAIMER (ARTIFICIAL INTELLIGENCE):

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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