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Case Series

Paediatrics Section

Clinical Spectrum and Severity of *Mycoplasma pneumoniae* Infection in Children From a Rural Tertiary Centre: A Case Series

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ABSTRACT

Mycoplasma pneumoniae, a common cause of Community Acquired Pneumonia (CAP) in children is traditionally considered a mild illness. Increasing evidence suggests broader clinical spectrum with significant respiratory and extrapulmonary involvement. This case series consists of 20 hospitalised children with laboratory-confirmed *M. pneumoniae* infection at rural tertiary care centre. Diagnosis was confirmed using respiratory Real-time Polymerase Chain Reaction (RT-PCR) in all patients, with serology performed in four children, all of whom tested positive. The median age observed was six years (IQR 2.5-9 years) with 12 males and 8 females. Six children (30%) were aged between six months-five years, 10 (50%) were 6-10 years and four above 10 years. RT-PCR for *Mycoplasma pneumoniae* was positive in all patients (100%). Fever (19/20) and cough (20/20) were the most common presenting symptoms. Extrapulmonary manifestations included dermatological and haematological involvement in 3/20 children each, and musculoskeletal involvement in 1/20. Disease severity was mild in 7/20 children, moderate in 6/20, severe in 6/20, and critical in 1/20. Eighteen children received macrolide therapy, of whom 6/18 required escalation to doxycycline. Respiratory support was required in 13/20 children, including oxygen therapy (6/20), non-invasive ventilation (6/20), and mechanical ventilation (1/20). Inflammatory markers were elevated, with a median C-reactive Protein (CRP) of 29 mg/L (IQR 5-40), while low-to-normal leukocyte counts were commonly observed. Nineteen children recovered and were discharged, while one child died due to refractory shock and respiratory failure. In resource limited settings where access to rapid molecular diagnostics may be constrained, recognition of indirect clinical and laboratory clues may aid early suspicion and management.

Keywords: Community acquired pneumonia, Extrapulmonary manifestations, Intensive care unit, Macrolide resistance, Respiratory insufficiency

INTRODUCTION

Mycoplasma pneumoniae is a leading cause of community-acquired respiratory infection in children and is classically associated with "atypical" pneumonia, characterised by prolonged cough and variable radiographic findings. However, the clinical spectrum of *M. pneumoniae* infection is heterogeneous, ranging from mild upper respiratory tract illness to severe pneumonia requiring intensive care support [1-3]. Beyond pulmonary disease, *M. pneumoniae* is increasingly recognised as a cause of diverse extrapulmonary manifestations, including neurological (encephalitis, transverse myelitis), dermatological {Mycoplasma-Induced Rash And Mucositis, (MIRM) erythema multiforme, Stevens-Johnson syndrome}, cardiac (myocarditis), haematological (autoimmune haemolytic anaemia, immune thrombocytopaenia), and thrombotic complications. These manifestations are thought to arise through a combination of direct pathogen-related effects, immune-mediated mechanisms such as molecular mimicry, and vascular inflammation [1,2,4]. The presence of extrapulmonary disease may obscure the underlying diagnosis, delay targeted therapy, and complicate clinical management. Recent data shows evolving patterns of *M. pneumoniae* infection, with reports of periodic surges of severe disease and increased detection, in the post Coronavirus Disease 2019 (COVID-19) era [5,6]. *M. pneumoniae* infection shows cyclical epidemics every 3-5 years, however, the 2024 global resurgence exceeded previous peaks and was likely driven by increased population susceptibility following reduced circulation during the COVID-19 pandemic [5]. Post pandemic surveillance studies have demonstrated a resurgence of *M. Pneumonia* infections among children and adolescents following the marked reduction in transmission during the COVID-19 pandemic, highlighting the need for continued epidemiological surveillance and further research into the factors underlying these changing patterns [6]. There is a raised concern regarding prolonged fever, delayed clinical response and need for second line therapy due to emerging macrolide resistant *M. pneumonia* [7]. These developments signify the need for detailed clinical descriptions from diverse healthcare settings, to guide diagnostic and therapeutic decision making.

CASE SERIES

Twenty children with confirmed *Mycoplasma pneumoniae* infection were included. The median age was six years (IQR 2.5-9 years), with 12 males and 8 females. RT-PCR was positive in all patients, while serology was positive in all four children in whom it was performed. Fever (19/20) and cough (20/20) were the most common presenting symptoms. Respiratory distress was present in 13/20 children, hypoxia in 7/20, and wheeze in 3/20. Radiological pneumonia was seen in 13/20 children, and pleural effusion in 6/20.

Extrapulmonary manifestations were observed in 7/20 children, including dermatological and haematological involvement in 3/20 each and musculoskeletal involvement in 1/20. Disease severity was mild in 7/20 children, moderate in 6/20, severe in 6/20, and critical in 1/20. Respiratory support was required in 13/20 children, including oxygen therapy (6/20), non-invasive ventilation (6/20), and invasive mechanical ventilation (1/20), with Intensive Care Unit (ICU) admission required in 13/20 cases.

Median CRP was 29 mg/L (IQR 5-40). Leukocytosis was uncommon while leukopaenia was observed in 4/20 children and most had

normal leukocyte counts. Eighteen children received macrolides, of whom six required escalation to doxycycline. Corticosteroids and Intravenous Immunoglobulin (IVIG) were administered in one patient each. Nineteen children recovered and were discharged, while one child died due to refractory shock and respiratory failure [Table/Fig-1].

CASES WITH EXTRAPULMONARY MANIFESTATIONS

Case 5

A nine-year-old male child presented with fever for five days, cough for four days, and difficulty in breathing for two days. Two days

Case	Age/Sex	Key presentation/ anthropometric interpretation	Pulmonary radiological findings	Extrapulmonary features	Diagnostics/ investigations	Respiratory support/ICU	Treatment	Outcome/duration of hospital stay
1	12 y/F	Fever 10 days, cough 10 days Appropriate for age	Left pleural effusion	Nil	PCR + IgM + CRP- 35 WBC - 4840 Gr%- 55% Ly%- 28% Cultures - No TB - negative Albumin-3.21	CPAP/PICU	Ceftriaxone + clindamycin followed by Azithromycin	Discharged 8 days
2	6 y/M	Fever 9 days, cough 9 days, breathing difficulty 2 days Moderate wasting with moderate stunting	Bilateral effusion with collapse consolidation	Nil	PCR + (MP + RV + Hi) CRP- 28 WBC - 9000 Gr%- 80% Ly%- 14 % Cultures - No TB - negative Albumin -2.47	CPAP/PICU	Ceftriaxone followed by oral Doxycycline	Discharged 7 days
3	11 y/F	Fever 8 days, Cough 8 days Appropriate for age	Left effusion with collapse	Nil	PCR +, IgM + CRP- 31 WBC - 4300 Gr%- 86% Ly%- 10% Cultures - No TB - Negative Albumin- 3.48	O2/PICU	Ceftriaxone followed by Azithromycin	Discharged 11 days
4	8 y/F	Fever 8 days Cough 8 days Breathing difficulty 2 days Appropriate for age	Bilateral consolidation	Nil	PCR + CRP- 49 WBC - 5200 Gr%- 65% Ly%- 28% Cultures - No TB - Negative Albumin- No	O2/PICU	Ceftriaxone followed by Azithromycin	Discharged 10 days
5	9 y/M	Fever 5 days, cough 4 days Breathing difficulty 2 days Appropriate for age	Right pleural effusion	Mycoplasma induced mucositis and rash	PCR +, IgM + CRP- 4 WBC - 3710 Gr%- 61% Ly%- 32% Cultures - No TB - negative Albumin- 3.29	HFNC, ICD, PICU	Cefotaxime, + Vancomycin followed by Azithromycin followed by doxycycline	Discharged 19 days
6	10 months/F	Fever 4 days cough, cold 4 days Appropriate for age	-	Nil	PCR + (MP+SP+Hi+I) CRP- 2 WBC - 8000 Gr%- 60% Ly%- 34% Cultures - No Albumin-No	None	Ceftriaxone + Azithro	Discharged 6 days
7	1 y/F	Fever 4 days, cough 4 days Appropriate for age	-	Nil	PCR + (IA+MP+Hi+SP) CRP- 29 WBC - 10230 Gr%- 14% Ly%-80% Cultures - No TB - Negative Albumin- No	None	Amoxicillin	Discharged 4 days
8	7 y/M	Fever 8 days, cough 5 days Appropriate for age	Right consolidation	Nil	PCR + (MP+Hi) CRP- 19 WBC - 3820 Gr%- 53% Ly%- 40% Cultures - No TB - Negative Albumin-3.73	None	Amoxicillin followed by Azithromycin	Discharged 5 days
9	1 y/M	Fever 2 days Cough 2 days rapid breathing 1 day Appropriate for age	Perihilar infiltrates	Nil	PCR + (IB+MP+SP+Hi) CRP- 5; WBC - 9790 Gr%- 47%; Ly%- 38% Cultures - No TB - Negative Albumin- No	O2/PICU	Ceftriaxone	Discharged 5 days
10	6 y/M	Joint pain 8 days, cough 4 days Appropriate for age	Nil	Arthritis	PCR + (RV+MP) CRP- 0.75 WBC - 9590 Gr%- 42% Ly%- 51% Cultures - No TB - Negative Albumin- 2.7	None	Doxycycline	Discharged 11 days

11	6 y/M	Fever 5 days Cough 5 days Appropriate for age	Right pneumonia	Nil	PCR + CRP- 0.71 WBC - 5910 Gr%- 55% Ly%- 34% Cultures - No TB - Negative Albumin-No	None	Ceftriaxone followed by Doxycycline	Discharged 7 days
12	2 y/ M	Fever 3 days cough 3 days Rapid breathing 3 days appropriate for age		Nil	PCR + (SP+ MP) CRP- 33 WBC - 5220 Gr%- 58.27% Ly%- 29.58% Cultures - No TB - Negative Albumin- No	O2/PICU	Azithromycin	Discharged 8 days
13	8 y/ F	Fever 8 days, cough cold 8 days Rapid breathing 2 days	Bilateral pneumonia, effusion (haemorrhagic effusion)		PCR + CRP- 306 WBC – 2090 Gr%- 66% Ly%- 30% Cultures - No TB - Negative Albumin-1.6	MV/PICU	Cefotaxime + Doxycycline + Steroid	Death 3 days
14	6 y/ M	Fever 4 days, cough 4 days Rapid breathing 1 day Appropriate for age	Right lobar pneumonia	Nil	PCR + (MP+Hi+SP) CRP- 39.66 WBC - 7400 Gr%- 56.6 Ly%- 36.3 Cultures - No TB - Negative Albumin- 4.24	O2/PICU	Ceftriaxone followed by Azithromycin	Discharged 6 days
15	6 y/ M	Fever 5 days cough cold 5 days Rapid breathing 2 days Underweight	Left pneumonia	Nil	PCR + (MP+Hi) CRP- 21 WBC - 3400 Gr%- 76.7% Ly%- 18% Cultures - yes (*Staphylococcus schleiferi*) TB - Negative Albumin- 2.91	HFNC	Ceftriaxone followed by Doxycycline	Discharged 8 days
16	12 y/ F	Fever 5 days, cough cold 5 days, rapid breathing 5 days (known case of sickle beta thal) Appropriate for age	bilateral consolidation	Cold AIHA (ICT +)	PCR + (MP+KP+SA) CRP- 29 WBC - 14900 Gr%- 53% Ly%- 27% Cultures- no growth TB - not done Albumin- 4.02	O2/PICU	Ceftriaxone followed by Azithromycin	Discharged 8 days
17	10 y/ F	Pallor 5 days (sickle cell disease), neck pain 2 day cough 8 days Appropriate for age	Right lobar consolidation	Cold AIHA (DCT +)	PCR + CRP-65.58 WBC- 9790 Gr%- 23% Ly%-59% Cultures - No TB - Negative Albumin-No	None	Azithromycin	Discharged 7 days
18	3 y/M	Fever Cough cold rash Appropriate for age	-	Nil	PCR + (MP+KP) CRP- 40 WBC - 3510 Gr%- 42% Ly%- 46% Cultures - No TB - Negative Albumin-No	HFNC/PICU	Azithromycin	Discharged 4 days
19	2 y/M	Fever 3 days, Cough cold 3 days, Rash 2 days Appropriate for age	Nil	KD	PCR + (PA+MP+SP) CRP- 87.63 WBC - 9580 Gr%- 59% Ly%- 37.5% Cultures- No TB- Negative Albumin- 3.17	None	Azithromycin followed by Doxy followed by IVIG + ASA	Discharged 10 days
20	11 y/M	Fever 5 days, Cough 3 days, Rapid breathing 2 days underweight	Right Effusion,	cold AIHA + (DCT +)	PCR + IgM + CRP- 34 WBC - 4710 Gr%- 27.8% Ly%- 60.7% Cultures - No TB - Negative Albumin-2.3	CPAP, ICD/ PICU	Ceftriaxone followed by Azithromycin	Discharged 10 days

[Table/Fig-1]: The clinical details of all 20 cases are presented below.
Abbreviations: PCR: Polymerase chain reaction; IgM: Immunoglobulin M; PICU: Paediatric intensive care unit; CPAP: Continuous positive airway pressure; O_2: Oxygen support; MP: *Mycoplasma pneumoniae*; RV: Rhinovirus; Hi: *Haemophilus influenza*; KP: Klebsiella pneumoniae; MV: Mechanical ventilation; ICD: Intercostal drainage; SCD: Sickle cell disease; AIHA: Autoimmune haemolytic anaemia; MIRM: Mycoplasma-induced rash and mucositis; KD: Kawasaki disease; RD: Respiratory distress; TB: Tuberculosis workup done on pleural fluid and sputum /GI aspirate; ICT: Indirect coombs test;DCT:Direct coombs test

prior to admission, the child developed progressive respiratory distress. He was initially treated at a private healthcare facility with oral amoxicillin-clavulanate for four days and injectable ceftriaxone and vancomycin for one day; however, there was no symptomatic

improvement, following which he was referred to our centre. On admission, the child was tachynoeic with a respiratory rate of 40/minute. Respiratory system examination revealed reduced air entry on the right hemithorax. Chest radiograph showed right-sided pleural effusion, which was further confirmed on ultrasonography of the chest along with underlying consolidation. Diagnostic pleural tapping revealed exudative pleural effusion. As the child had massive pleural effusion with respiratory distress, Intercostal Drainage (ICD) tube insertion was performed. Pleural fluid samples were sent for biochemical analysis and microbiological culture. Initial investigations showed haemoglobin of 13.8 g/dL, total leukocyte count of 3710/mm^3, platelet count of 1.14 lac/mm^3, granulocytes 61.9%, lymphocytes 31.9%, C-Reactive Protein (CRP) 4 mg/L, and Erythrocyte Sedimentation Rate (ESR) 10 mm/hour. Liver function tests showed borderline low serum albumin (3.29 g/dL). Blood cultures were sterile. Pleural fluid culture and pleural fluid (CBNAAT) for tuberculosis were also negative. The child was initially managed with intravenous cefotaxime 100 mg/kg/day in two divided doses and vancomycin. Further evaluation with nasopharyngeal swab RT-PCR detected *Mycoplasma pneumoniae*. Serum *Mycoplasma pneumoniae* IgM antibodies were also positive. Based on these findings, antibiotics were revised to inj. azithromycin 10 mg/kg/day, OD along with on day 4 of illness, which was continued till day 7 of illness along with inj. cefotaxime. Inspite of adequate dose and duration (72 h) of azithromycin therapy, the child continued to have persistent fever spikes. In view of suspected macrolide-resistant *Mycoplasma pneumoniae* infection, antibiotics were upgraded to intravenous doxycycline 5 mg/kg/day in two divided doses. The child subsequently showed gradual clinical improvement, with defervescence occurring by the third day of doxycycline therapy. During this course on the 10th day of illness, the child developed rash involving the oral mucosa and perianal region. Oral lesions were characterised by haemorrhagic crusting with occasional bleeding and significant discomfort. Additionally, maculopapular and morbilliform eruptions were noted in the perianal region. Symptomatic treatment including emollients and calamine lotion was administered. The lesions gradually resolved by day 15-16 of illness. Considering the characteristic mucosal involvement along with microbiological evidence of *Mycoplasma pneumoniae* infection, the rash was considered as Mycoplasma Induced Mucositis and Rash (MIMR) Appetite improved progressively, ICD tube was removed, and the child was discharged in stable condition on day 20 of hospitalisation.

Case 10

A six-year-old male child was admitted with complaints of cough and cold for eight days along with bilateral knee joint pain for four days. The respiratory symptoms were mild and not associated with significant breathing difficulty. Four days after the onset of respiratory symptoms, the child developed pain in both knee joints, which was associated with swelling and difficulty in walking. On examination, swelling and tenderness were present over both knee joints. Mild restriction of movements due to pain was noted. Other systemic examination findings were unremarkable. Laboratory investigations revealed haemoglobin of 9.5 g/dL, total leukocyte count of 9590/mm^3, platelet count of 3.43 lac/mm^3, granulocytes 42%, and lymphocytes 51%. Inflammatory markers showed ESR of 40 mm/hour and CRP of 0.75 mg/L. Liver function tests were within normal limits except for low serum albumin of 2.7 g/dL. Further evaluation was performed to identify the cause of arthritis. High-Performance Liquid Chromatography (HPLC) was done to rule out sickle cell disease and was normal. Antistreptolysin O (ASO) titre and complement C3 levels were also within normal limits. Ultrasonography of bilateral knee joints revealed soft-tissue oedema over the lateral aspect of both knee joints without significant joint effusion. A respiratory multiplex panel performed on nasopharyngeal swab detected *Mycoplasma pneumoniae*. Based on the clinical presentation and laboratory findings, a diagnosis of *Mycoplasma pneumoniae*-associated acute extrapulmonary manifestation was considered. The child was started on oral doxycycline 5 mg/kg/day in two divided doses, which was continued for seven days, orthopaedic opinion was also taken, they suggested medical pain management, patient was given paracetamol for pain. Gradually, the child showed clinical improvement with reduction in joint pain and swelling. Respiratory symptoms also subsided. The child was discharged after 10 days of hospital stay in stable condition.

Case 16

A 12-year-old female, a known case of sickle beta-thalasseamia, presented with complaints of cough for five days, fever for five days, and rapid breathing for two days. On examination, the patient was febrile, tachynoeic, and had reduced air entry bilaterally with dull percussion note over the right hemithorax. She was admitted to the Paediatric Intensive Care Unit (PICU) and was started on oxygen support via nasal prongs. Chest radiograph revealed right lung opacity with minimal pleural effusion, suggestive of pneumonia. The patient was initially started on intravenous ceftriaxone. Despite treatment, the child continued to have persistent fever spikes. Laboratory investigations revealed haemoglobin of 6.4 g/dL, total leukocyte count of 14900/mm^3, platelet count of 3.26 lac/mm^3, granulocytes 53%, lymphocytes 27%, and CRP of 29 mg/L. Peripheral blood smear examination showed features suggestive of immune haemolytic anaemia. Further evaluation revealed positive Indirect Coombs Test (ICT) along with elevated Lactate Dehydrogenase (LDH) levels 874 U/L and raised reticulocyte count 12%, suggestive of ongoing haemolysis. Respiratory multiplex panel performed on nasopharyngeal swab detected *Mycoplasma pneumoniae*. Considering the possibility of *Mycoplasma pneumoniae*-associated autoimmune haemolytic anaemia the patient was started on oral azithromycin 10 mg/kg/day once daily. Supportive care including maintenance of warmth with warm clothing and avoidance of cold exposure was ensured. In view of severe anaemia, warm packed red blood cell transfusion was administered under strict vital monitoring. Gradually, the patient showed clinical improvement with reduction in respiratory distress and stabilisation of haemoglobin levels. Fever subsided and oxygen requirement decreased progressively. The patient was discharged in stable condition after 10 days of hospital stay.

Case 17

A 10-year-old female child, a known case of sickle cell disease, was admitted with complaints of increasing pallor and cough for five days along with neck pain for two days. There was a history of cough and cold one week prior to hospitalisation, following which the cough persisted without significant improvement. On examination, the child had marked pallor but was haemodynamically stable and did not have features suggestive of cardiac failure. Systemic examination was otherwise unremarkable. Laboratory investigations revealed haemoglobin of 5.7 g/dL. Peripheral blood smear examination showed features suggestive of autoimmune haemolytic anaemia secondary to cold-reacting autoantibodies. Direct Coombs test (DCT) was positive, supporting the diagnosis of immune-mediated haemolysis. Considering the persistent cough, chest radiograph was performed, which revealed right-sided lobar pneumonia, although the child did not have significant respiratory symptoms clinically. Respiratory multiplex RT-PCR panel performed on nasopharyngeal swab detected *Mycoplasma pneumoniae* infection. Based on the clinical and laboratory findings, a diagnosis of *Mycoplasma pneumoniae*-associated autoimmune haemolytic anaemia was considered. The child was started on oral azithromycin 10 mg/kg/day. Supportive management including adequate hydration, maintenance of warmth using warm clothing, and ensuring warm room temperature was provided to prevent exacerbation of cold antibody-mediated haemolysis. As the child remained

haemodynamically stable without evidence of cardiac failure or severe symptomatic anaemia, blood transfusion was deferred and conservative management was continued. Gradually, the child showed clinical improvement. By the fifth day of oral azithromycin (10 mg/kg/day) once daily therapy, haemoglobin improved to 7.5 g/dL. Cough reduced significantly, and the child remained vitally stable throughout the hospital stay. She was discharged in stable condition after seven days of hospitalisation.

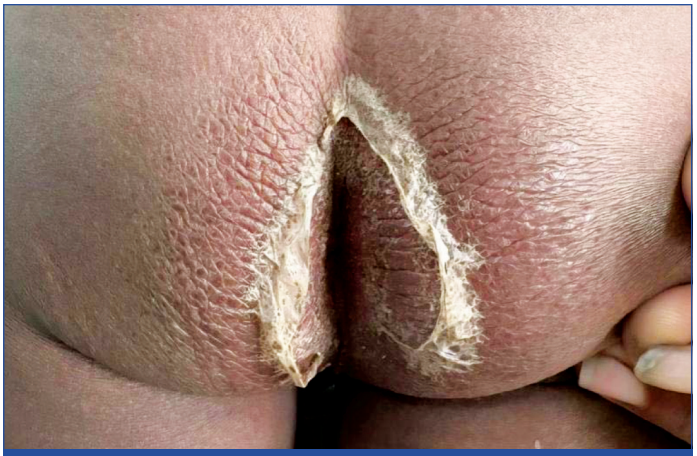
Case 19

A 2-year-old male child presented with complaints of fever for three days along with cough and cold for three days. On the following day, the mother noticed redness and flushing of the palms and soles along with erythematous rash over the neck region. The child also developed redness and excoriation of lips along with redness of eyes. On admission, the child was vitally stable.

Clinical examination revealed erythema and oedema over both hands and feet [Table/Fig-2]. Oral cavity examination showed congested oral mucosa with excoriated lips [Table/Fig-3], perianal rash [Table/Fig-4] and strawberry tongue. Bilateral conjunctival congestion was also present. The child was started on symptomatic treatment and further evaluated. Laboratory investigations revealed elevated inflammatory markers with CRP of 116 mg/L and ESR of 40 mm/hour. Complete blood count showed haemoglobin of 9.7 g/dL, total leukocyte count of 9580/mm^3 with granulocytes 59% and lymphocytes 37%, and platelet count of 3.94 lac/mm^3. Blood cultures, dengue IgM, and scrub typhus IgM were negative. Nasopharyngeal swab RT-PCR detected *Mycoplasma pneumoniae* infection. Considering the possibility of *Mycoplasma pneumoniae*-associated mucocutaneous manifestations, the child was started on emollients and smoothening agents along with oral azithromycin. However, due to suboptimal clinical response despite 48 hours after azithromycin treatment was escalated to intravenous doxycycline. Two-Dimensional Echocardiography (2D Echo) performed to look for any coronary dilatation, was within normal limits. However, the child continued to have persistent fever along with rising platelet counts and persistently elevated inflammatory markers. Clinically, the child fulfilled the criteria for Kawasaki disease. Hence, IVIG was administered at a dose of 2 g/kg as a single infusion over 12 hours. Oral moderate-dose aspirin was initiated at 30 mg/kg/day and continued until the child remained afebrile for 48 hours. His cutaneous lesions improved significantly following IVIG and were almost normal as he became afebrile. Preungual peeling was seen around 14th day of illness [Table/Fig-5]. Subsequently, aspirin was shifted to low-dose therapy at 4 mg/kg/day with a plan to continue for six weeks as guided by serial echocardiographic evaluation. Doxycycline was continued for a total duration of five days. The child showed gradual clinical improvement with resolution of fever and mucocutaneous manifestations. He was discharged in stable condition and kept under regular follow-up for serial 2D echocardiography to monitor for coronary artery dilatation. However, no coronary artery abnormalities have been detected on follow-up till date.

[Table/Fig-2]: Clinical examination revealed erythema and oedema over both hands and feet.

[Table/Fig-3]: Excoriated lips.



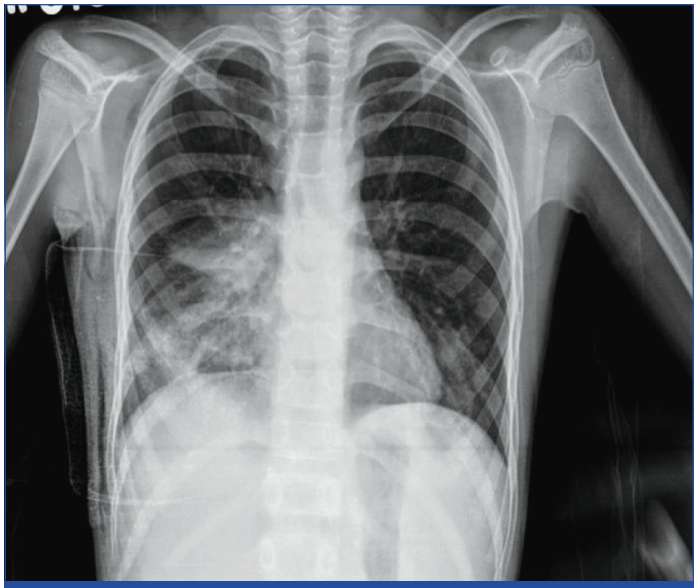
[Table/Fig-4]: Perianal rash.

[Table/Fig-5]: Periungual peeling, seen on day 14 of illness.

Case 20

An 11-year-old male child was admitted with complaints of fever, cough, and cold for five days. On admission, the child was febrile and tachynoeic. Respiratory system examination revealed reduced air entry over the right hemithorax along with dullness on percussion. The child was admitted to the PICU and was started on oxygen support through nasal prongs. Chest radiograph was suggestive of right-sided pneumonia with minimal pleural effusion [Table/Fig-6]. Intravenous ceftriaxone was initiated in view of severe community-acquired pneumonia. However, the child continued to have persistent fever spikes.

Initial laboratory investigations revealed haemoglobin of 8.6 g/dL, total leukocyte count of 4710/mm^3, granulocytes 27.8%, lymphocytes



[Table/Fig-6]: Chest X-ray of 11-year-old, male suggestive of right-sided synpneumonic effusion.

60.7%, and platelet count of 56,000/mm^3. Respiratory multiplex RT-PCR panel performed on nasopharyngeal swab detected *Mycoplasma pneumoniae* infection. Azithromycin therapy was initiated accordingly. On day 2 of hospitalisation, the child developed worsening respiratory distress, following which respiratory support was escalated to Continuous Positive Airway Pressure (CPAP) ventilation. Ultrasonography of the chest revealed increasing right-sided pleural effusion with collapse-consolidation of the underlying lung. Hence, ICD tube insertion was performed. Serial complete blood counts demonstrated progressive worsening of cytopenias with haemoglobin falling to 5.7 g/dL and platelet count decreasing further to 35,000/mm^3. DCT was positive, suggestive of immune-mediated haemolysis. In view of severe anaemia and thrombocytopaenia, the child was transfused with packed red blood cells and platelet concentrates. Despite four days of azithromycin therapy, the child did not show significant clinical improvement. Hence, antibiotics were escalated to inj. doxycycline 5 mg/kg/day in two divided doses in view of suspected macrolide-resistant *Mycoplasma pneumoniae* infection. However, during the course of treatment, the parents opted to shift the child to another healthcare centre and the patient was Discharged Against Medical Advice (DAMA).

DISCUSSION

M. pneumoniae is known to affect school-aged children [2-4,8,9], consistent with this epidemiological pattern in this case series. In current case series, hypoxia was documented in 35% and respiratory distress was present in 65% of children. Despite the higher occurrence of clinical respiratory compromise, radiological pneumonia was present in 65% of cases, highlighting the well recognised inconsistency between clinical severity and radiographic findings in *M. pneumoniae* infection. Around 30% of the patients had developed synpneumonic pleural effusion, further reflecting moderate to severe pulmonary involvement.

Disease severity was mostly moderate to severe, with PICU requirement for close monitoring and respiratory support in 65% of children. Approximately, one-third required oxygen therapy, and similar number required non-invasive ventilation. One patient required mechanical ventilation. In a recent study of 34 children with confirmed *Mycoplasma pneumoniae* infection, more than half of the patients had underlying co-morbidities, while only a small proportion required intensive care admission. Another study at Shanghai, showed that all patients 203 of *mycoplasma pneumoniae* needed respiratory support, including 64.5% patients (131/203) who received mechanical ventilation and 35.5% patients (72/203) who received high-flow nasal oxygen [10]. The higher PICU admission rate observed in our study may partly reflect institutional admission practices rather than greater disease severity alone. At our centre, children with significant tachypnea or even low-flow oxygen requirements are frequently admitted to the PICU for close monitoring and timely escalation of respiratory support if needed.

Out of 20 patients three had haematological manifestations, two had dermatological manifestations while one patient presented with musculoskeletal (large joints arthritis) complaints. Three patients demonstrated immune mediated haemolysis, with DCT positivity in two patients and indirect coombs test positivity in one patient, consistent with the known association between *Mycoplasma pneumoniae* infection and autoimmune haemolytic anaemia in previous studies [11-14].

Mycoplasma Induced Rash and Mucositis (MIRM) is an emerging entity (in this case series case 5), recently been recognised as distinct form of Stevens-Johnson syndrome or Erythema multiforme, characterised by limited skin involvement with predominantly affecting mucosa [15,16].

Kawasaki disease or Kawasaki like presentation has been described in association with *M. pneumoniae* infection, but although available evidences remains largely confined to case reports and small case series [17-19]. One child in our case series presented with joint pain, joint swelling and cough, but no fever and responded well to macrolide therapy. Afebrile or minimally symptomatic presentation with predominant extrapulmonary manifestation have been described in literature with *M. pneumoniae* infection, and highlight the need for a high index of suspicion, particularly in older children with nonspecific respiratory and musculoskeletal symptoms [2,11].

Two infants in our cohort who were positive for *Mycolplsma* infection in RT-PCR improved clinically without receiving macrolide or doxycycline therapy, both infants showed clinical improvement with supportive care, with one receiving a beta-lactam antibiotic and the other receiving ceftriaxone. Self-limiting nature of *Mycoplasma pneumoniae* infection can be likely reflected by this observation, particularly in younger children who may mount less aggressive immune response [3,20]. Detection alone, of multiple respiratory pathogens by Multiplex molecular assay does not establish pathogenic significance [3,11,20,21]. Clinical response to targeted antimycoplasma therapy, together with compatible clinical features therefore suggest a causative role of *M. pneumoniae*, while co-detected pathogen may represent colonisation or concurrent infections that were clinically less significant.

A new emerging problem is macrolide resistant *Mycoplasma pneumoniae* infection, it is being globally reported, and particularly in Asian countries [13,17,18]. The A2063G mutation was the predominant resistance associated mutation identified among macrolide resistant *M. pneumoniae* strains. However, studies suggest that 23S rRNA mutations alone may not predict disease severity or treatment outcomes, and the bacterial load and host immune response likely play important roles in development of severe or refractory disease. In our case series, escalation to doxycycline was required in one third of children, suggesting a possible macrolide resistance or poor response to first line therapy. Although resistance testing was not available at our institute, but clinical response to escalation was observed [7].

Additional immunomodulator therapy was used sparingly and reserved for selected cases, with severe manifestation, aligning with current evidence favouring individualised rather than routine use of corticosteroids or IVIG [3,9].

CONCLUSION(S)

Mycoplasma pneumoniae infection in children may present with moderate-to-severe disease requiring intensive care and respiratory support, challenging its traditional perception as "walking pneumonia." Normal or low leukocyte counts with relative lymphocytosis, elevated

inflammatory markers, and clinicoradiological discordance may aid early suspicion. Extrapulmonary manifestations such as haemolysis, rash and mucositis, Kawasaki-like illness, and arthritis highlight its multisystem nature. Variable therapeutic responses, including spontaneous recovery in some infants and the need for escalation beyond macrolides in others, emphasise the importance of individualised management, particularly in resource-limited settings.

Ethical Consideration: The case series was approved by the Institutional Ethics Committee (reference No- MGIMS/IEC/PED/01/2026). As this was a retrospective analysis of anonymised patient data, waiver of informed consent was granted. Patient confidentiality was strictly maintained throughout the study.

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