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STANDARD TREATMENT GUIDELINES 2022



Atypical Bacterial Pneumonia

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Atypical Bacterial Pneumonia

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Introduction

Community-acquired pneumonia (CAP) or infection of the lungs is a common cause of morbidity and mortality in children. In India, the typical organisms causing pneumonia are viruses [respiratory syncytial virus (RSV), human metapneumovirus (hMPV), influenza, and parainfluenza) and bacteria (gram-negative bacilli, *Staphylococcus aureus*, *Streptococcus pneumoniae*, and others). Pneumonia caused by atypical organisms (loosely referred to as “atypical pneumonia”) may be caused by *Mycoplasma pneumoniae*, *Chlamydophila pneumoniae*, and *Legionella pneumophila*.

- ☑ In general, *M. pneumoniae* and *C. pneumoniae* pneumonia are more common in children aged >3 years, *Chlamydia trachomatis* pneumonia is more frequent in infants, and *L. pneumophila* pneumonia is very rare in children aged <19 years.
- ☑ As per a recent study from India, *M. pneumoniae* and *C. pneumoniae* serology was positive in 4.3% and 1.1% of CAP in children, respectively. Polymerase chain reaction (PCR)-based analyses of pneumonia etiology report prevalence <1%. *L. pneumophila* is relatively rare in children, accounting for <0.01% of pneumonia cases.
- ☑ *M. pneumoniae* and *C. pneumoniae* are droplet infections caused by contact with an infected person. *L. pneumophila* spreads via aerosolization from humidifiers and hot water heaters. Human spread is not common.

Epidemiology

Clinical Features

- ☑ Pneumonia and tracheobronchitis are the main manifestations of *M. pneumoniae* infection.
- ☑ Children present with fever, malaise, sore throat, followed by cough that can last for 2–3 weeks.
- ☑ Extrapulmonary disease can affect the skin, central nervous system (CNS), blood, heart, gastrointestinal tract, and joints.
- ☑ Although, *M. pneumoniae* infection is self-limiting, it can lead to complicated pneumonia, parapneumonic effusions, necrotizing pneumonia, and bronchiolitis obliterans.
- ☑ Radiological findings are consistent with bronchopneumonia involving the perihilar areas and lower lobes with hilar lymphadenopathy. The degree of consolidation in chest X-ray may be more than that expected for the severity of clinical manifestations.
- ☑ *C. pneumoniae* and *M. pneumoniae* have similar clinical manifestations. Pneumonia is usually unilateral and involves the lower lobes.
- ☑ *Legionella* presents with high-grade fever and productive cough, chest pain, and quickly progresses to alveolar disease with cavitation. It causes more extensive extrapulmonary organ dysfunctions such as dyselectrolytemia and renal failure, liver failure, and rhabdomyolysis.

- ☑ PCR from an appropriate respiratory specimen is the best way of diagnosis. It should be remembered that nasopharyngeal specimens are only surrogates for appropriate specimens.
- ☑ A four-fold or greater rise in *Mycoplasma* immunoglobulin M (IgM) titer in the convalescent versus acute period suggests acute infection. However, *Mycoplasma* IgM can remain positive for a year after infection, therefore, a combination of IgM and PCR may help differentiate carrier state from acute infection. Serology alone is not reliable for accurate diagnosis of *Mycoplasma* or *Chlamydophila*.
- ☑ There is no standardized, validated test for diagnosis of *Chlamydophila*. As mentioned earlier, positive PCR can suggest *Chlamydophila* infection. Acute chlamydial infections are defined by a four-fold increase in the IgG titer or an IgM titer ≥ 16 ; and prior exposure is defined as an IgG titer ≥ 16 .
- ☑ The most common method for *Legionella* detection is the urinary antigen assay.

Diagnosis

- ☑ Atypical pathogens do not have a peptidoglycan cell wall, hence they do not respond to β -lactam antibiotics. Instead, they show good responses to protein synthesis inhibitors (macrolides and tetracyclines) or deoxyribonucleic acid (DNA) synthesis inhibitors (fluoroquinolones).
- ☑ Macrolides are the treatment of choice for atypical pneumonia because of their low minimum inhibitory concentration (MIC) and high safety profile in children. However, macrolide antibiotics should not be used indiscriminately and should be used only in confirmed *Mycoplasma* or *Chlamydia* infections. This is especially true in settings where macrolides are reserved for multidrug-resistant *Salmonella typhi* infection.
- ☑ There are reports of increasing incidence of macrolide-resistant *M. pneumoniae* pneumonia (MRMP) in some settings, although not in India. MRMP may be considered in patients with proven *Mycoplasma pneumoniae* who show no response to macrolide treatment for 72 hours.
- ☑ Levofloxacin and doxycycline are alternative second-line antibiotics for MRMP and their use should be restricted because of the risk of side effects. Tetracycline can induce permanent teeth discoloration and there are reports of tendinopathy with fluoroquinolones.

TABLE 1: Treatment of atypical bacterial pneumonia.

Age group and pathogens	Empirical antibiotic	Comments
1–6 months		
<i>Chlamydia trachomatis</i>	Azithromycin PO, 20 mg/kg once daily for 3 days	Conjunctivitis and staccato cough
≥6 months		
<i>Mycoplasma pneumoniae</i> or <i>Chlamydia pneumoniae</i>	Azithromycin PO, 10 mg/kg on day 1, followed by 5 mg/kg once daily from days 2–5	Alternative agents in case of macrolide resistance in an individual patient: <ul style="list-style-type: none"> ☑ Levofloxacin <ul style="list-style-type: none"> - <5 years: PO/IV 8–10 mg/kg twice daily - ≥5 years: PO/IV 10 mg/kg once daily ☑ Doxycycline <ul style="list-style-type: none"> - PO/IV 2.2 mg/kg every 12th hourly

Further Reading

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