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Chlamydia trachomatis Pneumonia in a 50-Day-Old Full-Term Male Infant Associated With Mucus Plugging of the Left Upper Lobe Bronchus and Left Upper Lobe Atelectasis

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Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
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Patient: Male, 50-day-old
Final Diagnosis: Atelectasis • *Chlamydia trachomatis* pneumonia
Symptoms: Cough • fever
Clinical Procedure: Bronchoscopy
Specialty: Pediatrics and Neonatology

Objective: Rare disease

Background: *Chlamydia trachomatis* (*C. trachomatis*) is a common vertically transmitted pathogen responsible for infantile pneumonia, which typically manifests as interstitial lung lesions and pulmonary hyperinflation. Lobar atelectasis resulting from mucus plug obstruction secondary to *C. trachomatis* infection is rarely observed in children. Here, we report a case of *C. trachomatis* pneumonia in a 50-day-old full-term male infant presenting with left upper lobe bronchial mucus plugging and atelectasis.

Case Report: A full-term, vaginally delivered 50-day-old male infant presented with a 15-day history of cough and normal oxygenation. Pre-admission imaging showed left upper lobe pneumonia accompanied by atelectasis and bronchial obstruction. Sputum polymerase chain reaction was positive for *C. trachomatis*, and bronchoalveolar lavage fluid (BALF) targeted next-generation sequencing (tNGS) further supported the etiological diagnosis. The infant was treated with erythromycin combined with bronchoscopic mucus plug clearance, and achieved complete clinical recovery, with no recurrence during 2 months of follow-up.

Conclusions: In the present case, conventional pathogen detection combined with BALF tNGS supported the diagnosis of *C. trachomatis* pneumonia associated with secondary airway mucus plugs and lobar atelectasis. Bronchoscopy provided valuable diagnostic and therapeutic benefits in this patient. This case report expands the recognized clinical and imaging spectrum of infantile chlamydial pneumonia and may provide a practical reference for the evaluation of similar atypical pediatric cases.

Keywords: bronchoscopy • child • *Chlamydia trachomatis* • mucus • pneumonia • pulmonary atelectasis

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/953643

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Introduction

Chlamydia trachomatis is a gram-negative, obligate intracellular pathogen that depends entirely on host cells for energy, growth, and replication, and cannot survive extracellularly [1]. As the leading cause of sexually transmitted infections globally, *C. trachomatis* is a major public health threat [2]. In 2020, the World Health Organization reported approximately 128.5 million new cases of *C. trachomatis* infection among adults and adolescents worldwide, with a notably higher burden in low- and middle-income countries [3]. Epidemiological data indicate a 4.2% prevalence of *C. trachomatis* infection among women aged 15 to 49 years and 2.7% among men in the same age group [4].

In adult women, *C. trachomatis* primarily causes reproductive tract infections, although most infections are asymptomatic and often undiagnosed in clinical practice [5]. When infection occurs during pregnancy, *C. trachomatis* can lead to adverse pregnancy outcomes such as stillbirth and preterm birth, with substantial risks to both maternal and neonatal health [6]. Neonatal *C. trachomatis* infection is predominantly acquired through mother-to-child vertical transmission, with an infection rate of 60% to 70% among vaginally delivered newborns of infected women [7]. Cesarean section-related infections are relatively rare and are usually complicated by premature rupture of membranes [8]. Neonatal infection after cesarean section with intact membranes (ie, membrane rupture occurring less than 12 hours prior to labor) is seldom reported [9]. Conjunctivitis is the most common clinical manifestation, while pneumonia develops in merely 7% to 20% of affected infants [10,11].

C. trachomatis frequently causes lower respiratory tract infections in infants aged below 6 months. A clinical study revealed that the pathogen was detected in about 30% of hospitalized infants within this age range [12]. These infections typically develop 4 to 11 weeks after birth, with an insidious onset and usually no fever, although some cases have low-grade fever. Affected infants often present with nasal congestion, rhinorrhea and cough, and tachypnea can occur in severe cases [5,13]. Preterm infants can present with apneic spells [2]. Pulmonary rales can be detected on auscultation, while wheezing is rare [2]. Without timely treatment, the disease can follow a prolonged course. Macrolide antimicrobials are the mainstay of treatment for *C. trachomatis* pneumonia in neonates and young infants, which can effectively alleviate clinical manifestations and optimize patient prognosis [2,13].

Laboratory tests for *C. trachomatis* infection mainly fall into 3 categories: morphological staining, immunological assays, and molecular nucleic acid detection [14]. Owing to suboptimal sensitivity, traditional morphological and immunological approaches cannot support early and accurate diagnosis. Currently, nucleic acid amplification tests (NAATs) targeting *C. trachomatis* DNA are the gold standard for clinical detection, achieving a sensitivity of 90% to 98% and a specificity of 98% to 99.8% [13,15]. Capable of identifying pathogens at concentrations as low as 1000 copies/mL, DNA-based NAATs are particularly suitable for early screening of *C. trachomatis* infection in neonates and infants [14].

Chest imaging plays a pivotal role in the diagnosis of *C. trachomatis* pneumonia. Imaging findings typically include interstitial lung changes, with localized emphysema and pulmonary consolidation seen in some patients [5]. Atelectasis is rare, and lobar atelectasis is extremely uncommon [16-20].

This report describes a case of *C. trachomatis* pneumonia in a 50-day-old full-term male infant associated with mucus plugging of the left upper lobe bronchus and left upper lobe atelectasis. The infant achieved favorable recovery after erythromycin treatment combined with bronchoscopic examination and airway clearance. This case report aims to enrich clinical experience and improve the recognition and management of similar atypical cases.

Case Report

A 50-day-old male infant was admitted to our hospital on January 15, 2026, with a 15-day history of persistent cough. During this period, the patient exhibited no significant tachypnea, dyspnea, conjunctival discharge, aspiration during feeding, vomiting, or diarrhea. Three days prior to admission, the patient experienced a low-grade fever that resolved spontaneously without intervention. Laboratory tests conducted at a local hospital prior to admission revealed a white blood cell count (WBC) of 11.2×10^9/L, a neutrophil ratio of 40.9%, an eosinophil ratio of 4.4%, and a high-sensitivity C-reactive protein (hs-CRP) level of 34.7 mg/L. Chest radiography revealed left upper lobe pneumonia (**Figure 1A**), and chest computed tomography (CT) showed left upper lobe atelectasis with stenosis and obstruction of the left upper lobe bronchus (**Figure 1B-1D**). No antibiotics were administered to the patient prior to transfer. The patient was subsequently transferred to our hospital for further evaluation and definitive diagnosis.

Physical examination on admission showed a body temperature of 36.5 °C, respiratory rate of 40 breaths per minute, and peripheral blood oxygen saturation (SpO_2) of 95%. There was no conjunctival hyperemia or ocular discharge. The patient breathed steadily, with slightly diminished breath sounds in the left upper lung and scattered moist rales bilaterally. The patient maintained normal oxygen saturation throughout hospitalization without supplemental oxygen. On the day of admission,

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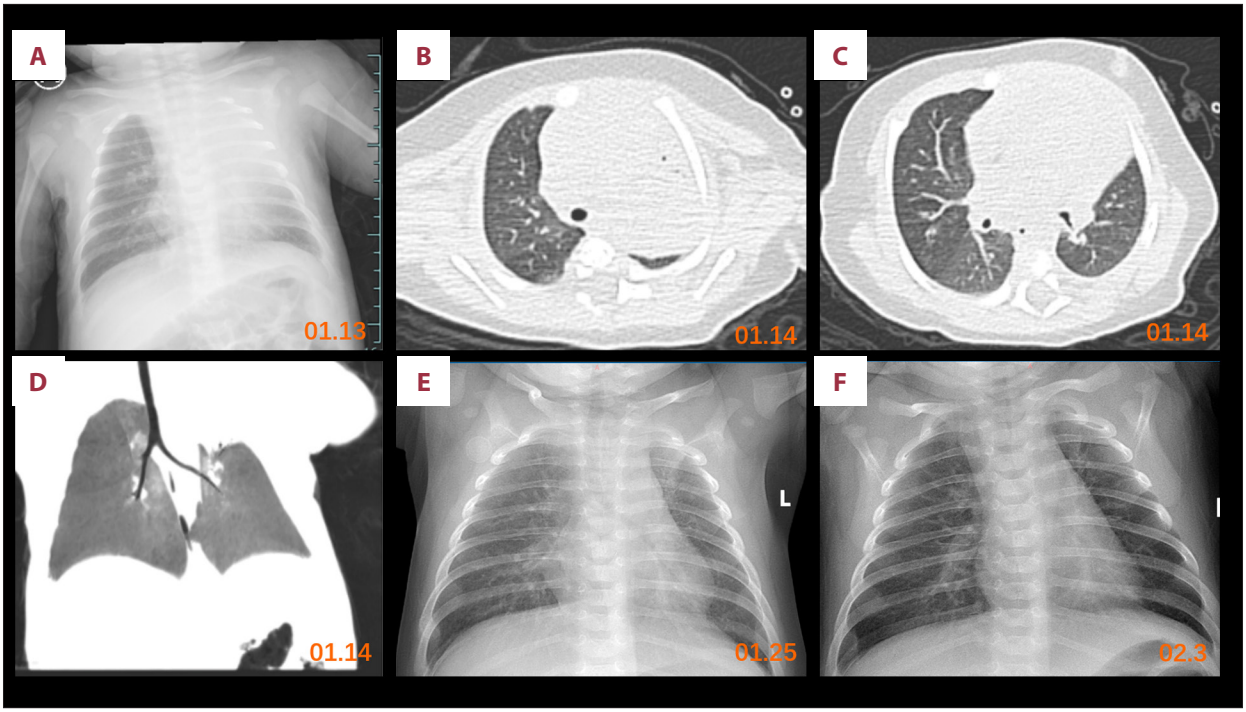

Figure 1. Chest imaging of our case. (**A**) Chest radiograph showing pneumonia in the left upper lung. (**B-D**) High-resolution chest computed tomography demonstrating left upper lung atelectasis, with stenosis and occlusion of the left upper lobe bronchus. (**E**) Follow-up chest radiograph after 11 days of treatment, showing significant resolution of left upper lung atelectasis. (**F**) Follow-up chest radiograph after 20 days of treatment, returning to normal.

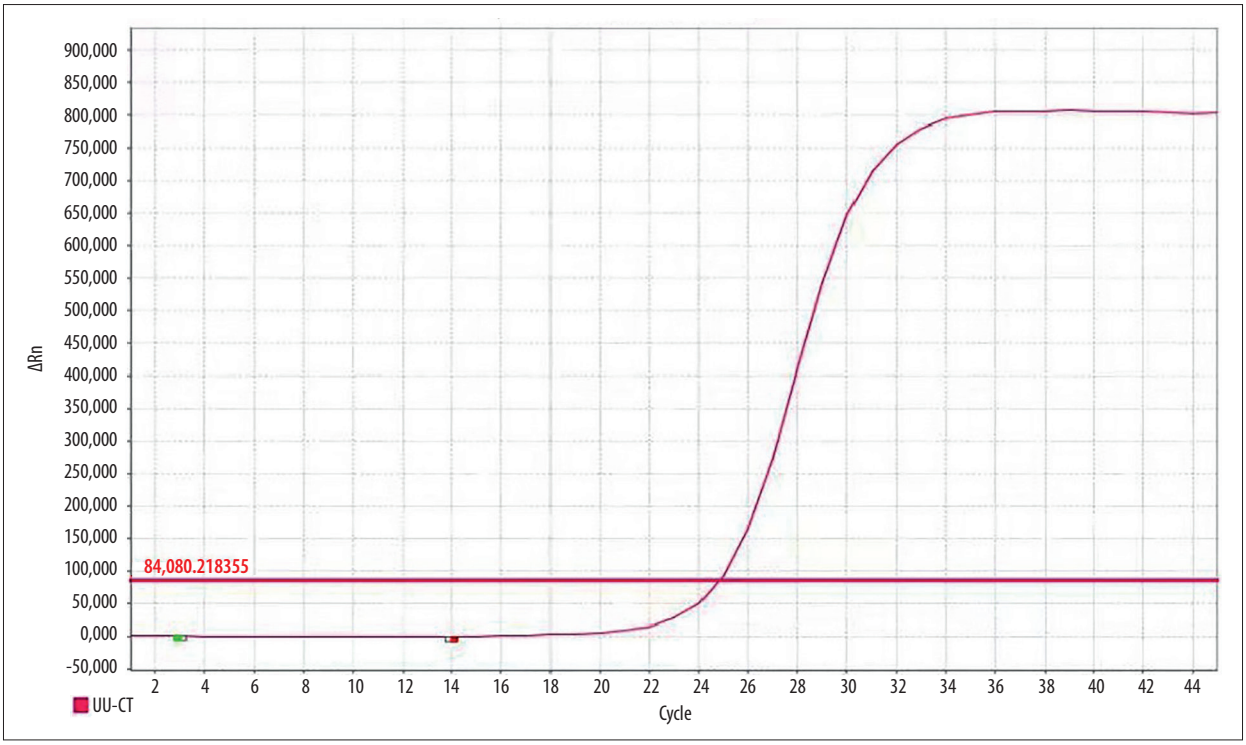

Figure 2. Amplification plot of polymerase chain reaction for *Chlamydia trachomatis* in sputum. A typical sigmoidal amplification curve was observed with a cycle threshold (Ct) value of 24.84. The assay positivity criterion was defined as a Ct value ≤38 accompanied by a typical sigmoidal amplification curve.

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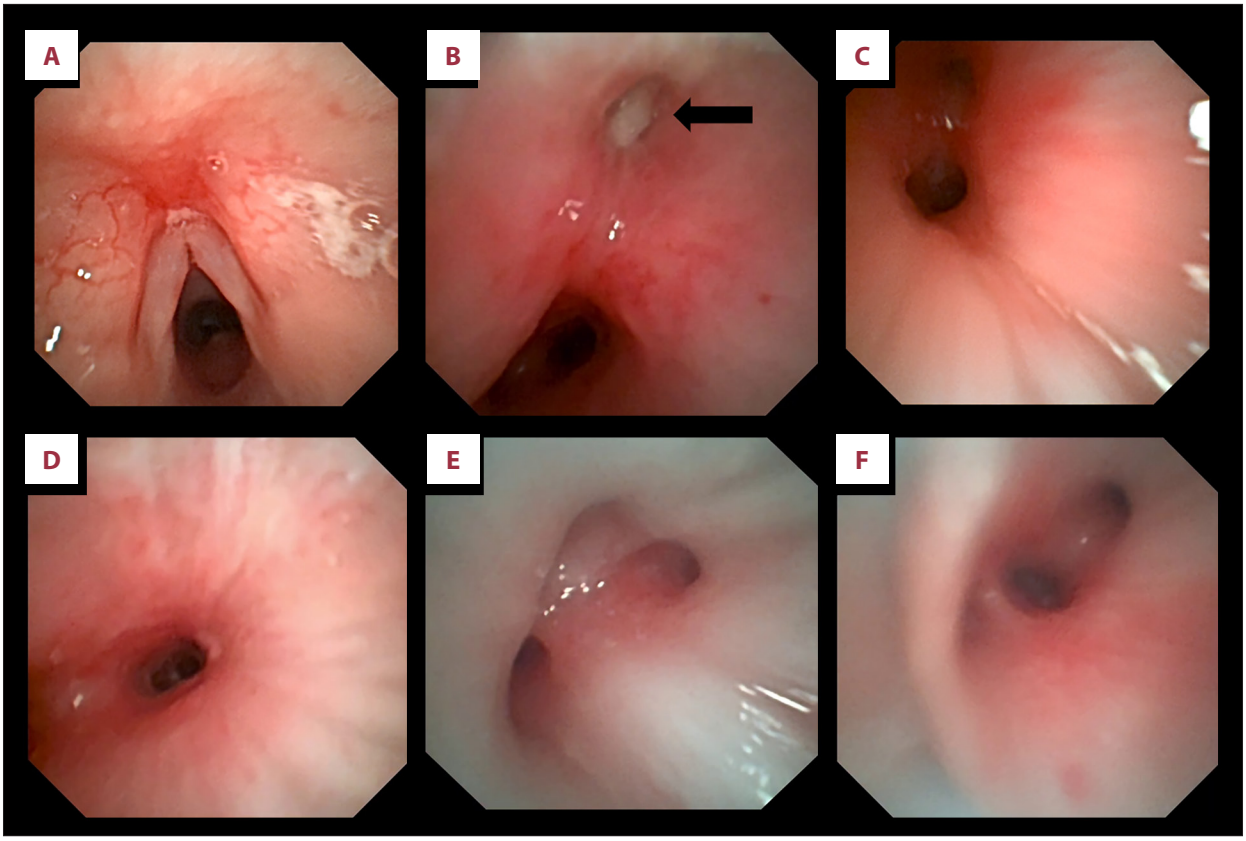

Figure 3. Bronchoscopic findings of the larynx, trachea, and bronchi. (**A**) Larynx. (**B**) Left secondary carina; the black arrow indicates mucus plug obstruction of the left upper lobe bronchus. (**C**) Left upper lobe bronchus patent after bronchoscopic lavage. (**D**) Left lower lobe bronchus. (**E**) Right upper lobe bronchus. (**F**) Right intermediate bronchus.

multiplex nucleic acid testing for common respiratory pathogens in sputum (including 12 pathogens: SARS-CoV-2, common coronaviruses, influenza A and B viruses, parainfluenza virus, *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, bocavirus, respiratory syncytial virus, adenovirus, metapneumovirus, and rhinovirus) yielded negative results. The T-cell spot of tuberculosis assay (T-SPOT.TB) test was also negative. On the same day, polymerase chain reaction (PCR) analysis of sputum for *C. trachomatis* DNA was positive, with results shown in the amplification plot (**Figure 2**). Serial complete blood counts showed mild eosinophilia (eosinophil ratio 6.6%-8.4%, absolute count 0.72-1.15 × 10^9/L). To further evaluate airway involvement, bronchoscopy was performed, which revealed mucus plugs in the left upper lobe bronchus. Mucoid secretions were aspirated, and no bronchial stenosis or obstruction was observed (**Figure 3**). Sputum and bronchoalveolar lavage fluid (BALF) cultures were negative. Cytological examination and *C. trachomatis* nucleic acid detection were not performed on the BALF. No *Mycobacterium tuberculosis* DNA was detected in the BALF. A summary of the patient's laboratory findings is provided in **Tables 1 and 2**.

Given the patient's atypical thoracic imaging findings, BALF specimens were submitted to Hangzhou Adicon Clinical Laboratories Co., Ltd. for targeted next-generation sequencing (tNGS) covering 363 prevalent pediatric respiratory pathogens. After automated library construction and qPCR quantification, high-throughput shotgun sequencing was performed. Human sequences were removed from high-quality reads, and the remaining data were aligned against microbial reference databases for pathogen identification and relative abundance quantification. Relative abundance was calculated as the percentage of valid reads assigned to a given microorganism relative to the total valid microbial reads. Both negative and positive controls were included in each tNGS run. Microorganisms identified in sequencing libraries were reported only if the sequencing data met quality control thresholds (Phred quality 20 (Q20) > 85%, Q30 > 80%) and the species was not detected in the negative control (NC) of the same sequencing run, or the reads per million (RPM) ratio between sample and NC was ≥ 5, which was used as a cutoff to distinguish true-positive results from background contamination. This assay yielded limits of detection (LOD) of 400 copies/mL for both gram-positive and gram-negative bacteria, 100 copies/mL for fungi, 400 copies/mL for DNA viruses and 200 copies/mL for RNA viruses. *C.*

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Table 1. Sequence of routine laboratory test results during hospitalization.

	13 Jan	15 Jan	18 Jan	21 Jan	24 Jan
Hematology					
White blood cell (4-12 × 10^9/mL)	11.2	9.58	13.74	13.23	10.53
Eosinophil% (1%-6%)	4.4	0.1	8.4	6.6	6.8
Eosinophil count (0.05-0.5 × 10^9/mL)	0.49	0.01	1.15	0.87	0.72
Platelet count (100-400 × 10^9/mL)	324	438	538	583	477
Biochemistry/coagulation					
Alanine aminotransferase (8-71 U/L)	–	42	–	53	–
Ddimer (<0.55 mg/L)	–	1.39	0.78	0.07	–
Inflammatory markers					
Highsensitivity Creactive protein (0-6 mg/L)	34.7	14.78	3.09	0.72	0.26
Procalcitonin (<0.5 ng/mL)	–	0.16	0.13	–	–
Erythrocyte sedimentation rate (0-20 mm/h)	–	35.97	–	–	–

Note: –, Not done (tests not performed on the corresponding day).

Table 2. Results of pathogen-related tests during hospitalization.

Test item	Specimen	Test date	Result
Tuberculosis infection T cell detection	Blood	15 Jan	Negative
12-pathogen respiratory nucleic acid test* (including *Chlamydia pneumoniae*)	Sputum	15 Jan	Negative
Blood and sputum culture	Blood & sputum	15 Jan	Negative
Chlamydia trachomatis DNA	Sputum	15 Jan	Positive
Chlamydia trachomatis DNA	BALF	16 Jan	–
Culture	BALF	16 Jan	Negative
Tuberculosis smear	BALF	16 Jan	Negative
Mycobacterium tuberculosis DNA	BALF	16 Jan	Negative
Mycoplasma pneumoniae DNA	BALF	16 Jan	Negative

Note: BALF, bronchoalveolar lavage fluid; –, tests not performed on the corresponding day. * The 12-pathogen respiratory nucleic acid test includes: SARS-CoV-2, common coronaviruses, influenza A and B viruses, parainfluenza virus, *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, bocavirus, respiratory syncytial virus, adenovirus, human metapneumovirus, and rhinovirus.

Table 3. The tNGS results of BALF in the present patient.

Pathogen	Reads	Relative abundance (%)
Chlamydia trachomatis	85691	49.1
Streptococcus mitis	9563	5.48
Rothia mucilaginosa	399	0.23

Note: tNGS, targeted next-generation sequencing; BALF, bronchoalveolar lavage fluid.

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trachomatis showed markedly elevated sequence abundance beyond the LOD. Meanwhile, low-abundance *Streptococcus mitis* and *Rothia mucilaginosa*, normal commensals of the oropharynx and upper respiratory tract, were detected and deemed clinically non-pathogenic. No other pathogens fulfilled the reporting criteria. The detailed results are presented in **Table 3**.

The infant was born at full term via vaginal delivery, with a birth weight of 3.1 kg, and was exclusively breastfed. No conjunctivitis symptoms were observed since birth. The mother underwent screening for human immunodeficiency virus and syphilis during pregnancy, with all results negative, and no *C. trachomatis* screening was performed. There was no premature rupture of membranes. The interval from membrane rupture to delivery was not documented in medical records, which is a limitation for assessing the plausibility of vertical transmission. No antibiotics were administered to the mother throughout labor and the entire perinatal period. In addition, the mother showed no clinical signs of *C. trachomatis* infection (eg, increased vaginal discharge, frequent urination, urgency, or lower abdominal pain) and declined etiological testing for *C. trachomatis*.

After confirming *C. trachomatis* infection, standard erythromycin therapy was initiated immediately at a daily dose of 40 mg/(kg·d) for a 14-day course. Bronchoscopy was performed on the same day as the medication administration. To avoid excessive radiation exposure, immediate post-procedural chest imaging was omitted. The initial follow-up chest X-ray on day 10 of treatment showed substantial improvement in left upper lobe atelectasis (**Figure 1E**). The patient presented with stable vital signs (temperature 36.4 °C, respiratory rate 35 breaths per minute, SpO_2 98%) and no bilateral lung rales, and was then discharged. Complete resolution of atelectasis was confirmed on a repeat chest radiograph at treatment day 19 (**Figure 1F**). It remains unclear whether the improvement of pulmonary lesions was caused by erythromycin monotherapy, bronchoscopic mucus plug aspiration, or a combination of the 2 interventions.

At the 2-month follow-up, the patient remained asymptomatic with no recurrence. The follow-up period of this study was only 2 months, mainly due to the time span from the patient's discharge to the completion of manuscript writing being only 2 months, making it impossible to obtain longer-term follow-up data. Although the follow-up period is limited, the available 2-month follow-up results show that the therapeutic effect is stable, and no recurrence of related symptoms was observed, which can effectively support the conclusion of this study.

This 50-day-old full-term infant presented with a 15-day cough and radiologically confirmed left upper lobe atelectasis. A systematic differential diagnosis was further performed to rule out common etiologies of infantile atelectasis. (1) *Streptococcus pneumoniae* and *Staphylococcus aureus* pneumonia: *S. pneumoniae* and *S. aureus* commonly cause community-acquired pneumonia in infants. Typical cases show elevated WBC count and hs-CRP, accompanied by persistent fever, purulent sputum and systemic toxic signs. *S. pneumoniae* infection features lobar consolidation, while *S. aureus* pneumonia deteriorates rapidly and is complicated by bullae, abscesses and empyema. The infant developed only transient low-grade fever that resolved spontaneously, with normal WBC count and slightly elevated hs-CRP. All cultures and BALF tNGS were negative for the 2 pathogens. Accordingly, infection with these 2 organisms was excluded. (2) Viral pneumonia: Viral infection is a common cause of pneumonia and secondary atelectasis in infants, with human bocavirus and respiratory syncytial virus being the most prevalent pathogens. In the present case, nucleic acid detection for 12 common respiratory pathogens and BALF tNGS yielded negative results for viruses. Additionally, the patient exhibited no typical clinical manifestations of viral infection, such as wheezing and paroxysmal dyspnea. Collectively, the available clinical and laboratory evidence does not sufficiently support a viral etiology of the current atelectasis. (3) Congenital airway malformation: Congenital airway stenosis and structural anomalies primarily account for persistent or recurrent atelectasis in infants. This case was characterized by acute onset, without a postnatal history of recurrent cough or repeated pulmonary infections. Bronchoscopy excluded airway stenosis and organic bronchial obstruction. In addition, the complete resolution of atelectasis after antimicrobial therapy was inconsistent with the chronic and recurrent clinical course of congenital airway disorders, rendering this etiology less probable. (4) Extrinsic compressive atelectasis (secondary to mediastinal lesions and cardiothoracic vascular malformations): Mediastinal masses, mediastinal or hilar lymphadenopathy, and congenital cardiothoracic vascular malformations may compress the bronchial lumen and induce secondary atelectasis, a key differential diagnosis of infantile atelectasis. In this case, chest CT revealed none of the above compressive abnormalities, and no bronchial stenosis was observed on bronchoscopy. In addition, the infant had no tuberculosis exposure history and negative tuberculosis-related tests, ruling out tuberculous lymphadenopathy and subsequent secondary atelectasis.

Discussion

This report describes a rare case of infantile *C. trachomatis* pneumonia complicated with airway mucus plug formation and secondary lobar atelectasis. Several case-specific insights were summarized based on this patient's clinical course. First, this case exhibited atypical imaging features of *C. trachomatis* pneumonia, manifested as mucus plug formation and subsequent

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lobar atelectasis. Second, the combination of sputum nucleic acid testing and BALF tNGS facilitated etiological diagnosis in this atypical case. Third, the combined regimen of antimicrobial treatment and bronchoscopic airway intervention successfully cleared airway mucus plugs and achieved a favorable clinical outcome in this patient.

Maternal *C. trachomatis* infection may be vertically transmitted to neonates through intrauterine infection, intrapartum genital exposure, puerperal contact and other pathways, with intrapartum transmission predominating [7]. A previous study demonstrated that infants delivered by cesarean section account for approximately one-fifth of pediatric patients with *C. trachomatis* pneumonia [7]. Neonatal *C. trachomatis* infection typically manifests as conjunctivitis or pneumonia, and severe infections can further deteriorate into respiratory failure, leading to substantial respiratory impairment [2,10]. The present vaginally delivered infant only had pneumonia, with no conjunctival complications observed throughout hospitalization.

Most cases of neonatal *C. trachomatis* pneumonia occur within the first 8 weeks after birth, with an earliest onset at postnatal week 2. Most patients delay medical consultation for more than 20 days following the appearance of symptoms [10,16]. Younger neonates and preterm infants are at substantially elevated risk of severe complications such as apnea and respiratory distress [17,21, 22]. As reported by Souza et al [16], fever was present in 3 of 15 affected infants, which matched the clinical profile of our patient. At 5 weeks of age, the infant presented with classic cough, transient low-grade fever, and pulmonary moist rales. The child was born at term and remained free of hypoxia throughout the illness.

Infants with *C. trachomatis* infections often exhibit peripheral eosinophilia, with counts frequently reaching or exceeding 400 cells/mm^3, possibly due to delayed hypersensitivity responses to the pathogen [7,23-26]. Previous studies have shown a significantly higher incidence of eosinophilia in *C. trachomatis*-positive infants than in uninfected controls (33% versus 5%) [27]. However, López-Hurtado et al [28] reported that this association is less pronounced in preterm infants, with no significant increase in eosinophil counts among *C. trachomatis*-infected preterm infants. The present case, involving a term infant, displayed marked peripheral eosinophilia, which is consistent with findings in other term infants as reported in the studies previously mentioned.

The most common radiological findings in *C. trachomatis* pneumonia include interstitial infiltrates and pulmonary hyperinflation [5,8,10,21]. Available evidence suggests that atelectasis is an extremely uncommon complication of infantile *C. trachomatis* pneumonia [16-20]. Among 15 infected infants reported by Souza et al [16] and 46 cases described by Martins et al [17], only 1 case of atelectasis was identified in each cohort, further confirming the rarity of this radiological manifestation. Gencay et al [19] reported a higher frequency of atelectasis in infants of *C. trachomatis*-seronegative mothers compared with IgM-seropositive mothers. Although these studies have characterized the general features of *C. trachomatis* pneumonia, the cases complicated by atelectasis were sporadic and insufficient for subgroup analysis. Consequently, detailed clinical profiles, specific diagnostic courses, and individual disease progression of infants with *C. trachomatis* pneumonia and concurrent atelectasis have not been well described in the literature. The present case therefore provides a detailed illustration of this rare atypical manifestation, enriching the currently limited clinical data.

To screen for potential co-infection, tNGS was performed on the patient's BALF specimens. Traditional diagnostic approaches, including culture, antigen-antibody assays, and PCR, cannot achieve high-throughput screening for a broad spectrum of pathogens, and generally yield low positive rates for bacterial and fungal pathogens in routine sputum and BALF tests [29,30]. By virtue of its outstanding efficiency, sensitivity, and cost-effectiveness, tNGS has emerged as a robust modality for precise etiological diagnosis of infectious diseases [29]. It has been reported that the combination of conventional assays and tNGS achieves a definitive pathogen detection rate of 89% in children with pneumonia, significantly enhancing diagnostic accuracy [31]. Although routine laboratory tests and BALF tNGS revealed no evidence of alternative pathogens in the present case, false-negative results are an inherent limitation of all microbiological examinations; thus, co-infection cannot be entirely excluded. Given the favorable clinical response to exclusive erythromycin monotherapy, the lobar atelectasis in this infant was presumably attributable to isolated *C. trachomatis* infection.

Atelectasis is a clear indication for bronchoscopy [32]. In this patient, bronchoscopy revealed mucus plugging. Of note, clinical and mechanistic investigations focusing on atelectasis secondary to *C. trachomatis* infection remain extremely limited. Most studies only briefly describe this clinical phenomenon without systematically exploring its underlying pathogenic process. Accordingly, the mechanistic interpretation presented in this study is merely a reasonable clinical hypothesis. Additionally, the present case lacked detection of bronchoalveolar lavage fluid inflammatory biomarkers and mucus physicochemical characteristics, resulting in the absence of direct quantitative evidence to validate the speculated pathological cascade. Given the consistent inflammatory and mucus-secreting patterns among atypical respiratory pathogens, and referring to the well-established mechanism of mucus retention induced by *Mycoplasma pneumoniae* infection [33], *C. trachomatis* infection can provoke airway mucosal congestion, edema, and

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inflammatory exudation, which could augment the volume and viscosity of airway secretions. In combination with the inherent physiological deficiencies of infant airways, including narrow lumens, attenuated ciliary motility, and impaired mucociliary clearance, these abnormally viscous secretions can gradually accumulate and consolidate within the bronchial tree, forming mucus plugs that can occlude segmental or lobar bronchi. Such sequential pathological alterations may induce ventilatory dysfunction and alveolar collapse, eventually leading to the development of obstructive lobar atelectasis. Bronchoscopy is not part of the routine management for *C. trachomatis* pneumonia [2,5], and its application in the treatment of atelectasis secondary to this infection has been rarely reported [16,17]. In the present case, bronchoscopy provided valuable assistance for the diagnosis, differential diagnosis, and treatment of the patient.

Erythromycin (40-50 mg/kg/day for 14 days) is the recommended first-line treatment for C. trachomatis pneumonia in infants and young children [2,5,9,16,17,21,23,34]. A 3-day oral course of azithromycin at a daily dose of 20 mg/kg serves as a valid alternative therapeutic regimen [2]. Of note, both erythromycin and azithromycin possess unique safety concerns. Their use in infants younger than 6 weeks of age may predispose patients to infantile hypertrophic pyloric stenosis or intestinal obstruction, thereby necessitating rigorous clinical monitoring throughout the treatment course [2,5].

Conclusions

This report describes a rare and atypical presentation of infantile *C. trachomatis* pneumonia complicated with airway mucus plug formation and secondary lobar atelectasis. Combined conventional microbial assays and BALF tNGS achieved etiological confirmation in this infant with unusual imaging manifestations. Bronchoscopy offered prominent diagnostic and adjunctive therapeutic values, facilitating satisfactory clinical recovery in this infant. The single-case experience summarized herein may serve as a practical reference for the clinical evaluation and management of similar atypical pulmonary infections in pediatric populations.

Department and Institution Where Work Was Done

The Children's Hospital, Zhejiang University School of Medicine, National Clinical Research Center for Children and Adolescents' Health and Diseases, Hangzhou, Zhejiang, PR China.

Patient Consent

All procedures and publication of this report were performed with consent from the patient's parents.

AI Declaration

The authors used an AI-assisted language model (Doubao, ByteDance) for language editing and improvement of manuscript clarity. The AI tool was not used for data generation, clinical decision-making, or formulation of conclusions. All content was carefully reviewed and verified by the authors, who take full responsibility for the final version of the manuscript.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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