Clin. Lab. 2026;72:XXX-XXX

CASE REPORT

Two Cases of Severe Chlamydia psittaci Pneumonia with Respiratory Failure and Literature Review

Gangfeng Li [1, 2], Ningping Dan [1, 2], Tao Lu [1, 2]

[1] *Department of Clinical Laboratory Center, Shaoxing People's Hospital, Shaoxing, P.R. China*
[2] *The First Affiliated Hospital, Shaoxing University, Shaoxing, P.R. China*

SUMMARY

Background: **Chlamydia psittaci pneumonia is a zoonotic disease with non-specific clinical manifestations, often leading to delayed diagnosis. Metagenomic next-generation sequencing (mNGS) can help us identify pathogens in a timely manner and quickly adjust treatment strategies.**
Methods: **We reported two cases of severe Chlamydia psittaci pneumonia with respiratory failure and reviewed relevant literature.**
Results: **Both patients were diagnosed with Chlamydia psittaci infection through mNGS after routine pathogen testing failed. After using Omadacycline based treatment, the patients' clinical and radiological characteristics improved significantly and were successfully cured.**
Conclusions: **For patients infected with Chlamydia psittaci pneumonia, timely identification of the pathogen is crucial. mNGS can quickly detect Chlamydia psittaci in critically ill patients, guide clinical timely targeted treatment, and improve patient symptoms.**
(Clin. Lab. 2026;72:xx-xx. DOI: 10.7754/Clin.Lab.2025.250675)

Correspondence:
Tao Lu
Department of Clinical Laboratory Center
Shaoxing People's Hospital
Shaoxing, 312000
P.R. China
Phone: +86 18658531520
Email: lukerende@163.com

KEYWORDS

Chlamydia psittaci, metagenomic next-generation sequencing (mNGS), respiratory failure

INTRODUCTION

Community acquired pneumonia is one of the major causes of morbidity and mortality worldwide. Its pathogens are diverse, including Streptococcus pneumoniae, Haemophilus influenzae, Chlamydia psittaci and so on [1]. Chlamydia psittaci is an obligate intracellular parasitic Gram-negative bacterium mainly from birds, accounting for only about 1% of pneumonia pathogens. However, due to the lack of clinical understanding of Chlamydia psittaci pneumonia and the atypical clinical manifestations, the diagnosis was delayed and the treatment was not timely, which made the patient progress to severe pneumonia, complicated with respiratory failure and other serious complications [2,3]. The limitations of traditional identification methods for Chlamydia psittaci further exacerbate the diagnostic dilemma, resulting in a

Case Report accepted June 26, 2025

Table 1. Pathogen detection results of the two cases.

Pathogen testing	Case 1	Case 2
COVID-19	-	-
Acid-fast bacilli	-	-
Cryptococcus neoformans	-	-
Sputum Culture	-	-
Blood culture	-	-
G test	-	-
GM test	-	-
Influenza A virus	-	-
Influenza B virus	-	-
Parainfluenza virus	-	-
Chlamydia pneumoniae	-	-
Mycoplasma pneumoniae	-	-
Respiratory syncytial virus	-	-
Metapneumovirus	-	-
Clostridium difficile	-	-
Chlamydia psittaci	+ (478,454)	+ (949)

considerable number of cases being unable to determine the pathogenic cause. The emergence of mNGS technology provides a comprehensive and rapid pathogen detection method for clinical samples that does not rely on culture, and provides a key tool for identifying difficult to culture pathogens such as Chlamydia psittaci [4]. This article reports two cases of severe Chlamydia psittaci pneumonia complicated with respiratory failure, aiming to clarify the key role of mNGS in diagnosis and emphasizes the need for clinical doctors to improve their understanding of this rare pathogen in critically ill pneumonia cases.

CASE PRESENTATION

Case 1

On April 4, 2025, a 69-year-old female was hospitalized for cough for one month and fever for three days (up to 39.4℃). The patient visited another hospital three days ago and was treated with moxifloxacin, but the effect was not satisfactory. Auxiliary examination: CRP 202.94 mg/L↑; Blood gas analysis: carbon dioxide partial pressure 28.5 mmHg↓, oxygen partial pressure 63.9 mmHg↓; Chest CT scan: Infectious lesions in both lungs. At the same time, pathogenic examinations should be conducted on the patient's blood, sputum, urine, etc. The routine microbiological results all showed negative reactions (Table 1). After admission, due to the severity of the patient's condition and concomitant respiratory failure, we used ceftriaxone for anti infective treatment and supplemented it with non-invasive ventilator assisted ventilation. However, there was no significant improvement in the patient's symptoms. Considering the possibility of special pathogen infection, we further performed bronchoscopy and mNGS testing. On April 8th, the mNGS results of bronchoalveolar lavage fluid showed positive for Chlamydia psittaci, and the treatment plan was immediately adjusted to use Omadacycline for targeted treatment. After treatment, the patient's body temperature gradually returned to normal, inflammation indicators steadily decreased, oxygen and index gradually increased, and lung lesions were gradually absorbed in subsequent chest imaging examinations. After 10 days, the patient was basically cured and discharged from the hospital. After follow-up, the patient has resumed normal life.

Case 2

On May 9, 2025, a 70-year-old male was admitted for treatment due to "fever with cough for 4 days". The patient took cephalosporin antibiotics on their own without any improvement in symptoms. The auxiliary examination upon admission showed that the white blood cell count was 15.12 x 10^9/L↑, the percentage of neutrophils was 88.9%↑, CRP was 200.74 mg/L↑, and serum amyloid protein was 433.05 mg/L. Blood gas analysis: The partial pressure of carbon dioxide is 26.6 mmHg↓, and the partial pressure of oxygen is 79.0 mmHg↓. CT shows bilateral consolidation and pleural effusion. The patient was diagnosed with pneumonia and respiratory failure. In terms of treatment, piperacillin sodium and tazobactam sodium are given in combination with levofloxacin for anti infection. For several consecutive days, the patient's body temperature did not show a significant decrease, and the results of routine pathogen testing were all negative (Table 1). Upon further investigation of the patient's medical history, it was discovered that he had recently been in contact with pigeons. The possibility of Chlamydia psittaci infection was considered, and sputum mNGS examination was completed. On May 12th, sputum mNGS showed positive for Chlamydia psittaci. Treatment was immediately switched to Omadacycline for targeted anti infective treatment, supplemented with methylprednisolone treatment. After 5 days, the patient's body temperature returned to normal, there was no obvious cough, and the inflammatory indicators improved compared to before. The patient recovered and was discharged from the hospital.

DISCUSSION

The two severe cases of Chlamydia psittaci pneumonia with respiratory failure in this study emphasize the importance of timely identification of the pathogen and initiation of targeted therapy. Consistent with previous studies, the non-specific clinical manifestations of Chlamydia psittaci pneumonia and the limitations of traditional detection methods can easily lead to misdiagnosis

and delayed treatment, exacerbating the patient's condition and even developing into multiple organ failure [3]. The metagenomic next-generation sequencing (mNGS) technology directly extracts nucleic acids (DNA and RNA) of all pathogenic microorganisms from clinical samples, performs high-throughput sequencing, and compares the results with sequence databases for bioinformatics analysis, thereby achieving synchronous detection of multiple pathogens such as bacteria, fungi, viruses, parasites, etc. [4]. This technology has the advantages of no need for cultivation, fast and broad-spectrum coverage of pathogens, providing a powerful tool for early identification of difficult to cultivate and atypical pathogens such as Chlamydia psittaci [5,6]. In this case, high sequence numbers of Chlamydia psittaci were detected by mNGS from bronchoalveolar lavage fluid and sputum, despite routine pathogen testing being negative. Based on the mNGS results, we promptly adjusted the anti infection regimen to targeted therapy with Omadacycline as the main treatment, and the patient's clinical symptoms, inflammatory indicators, and imaging manifestations improved significantly and rapidly.

The successful management of these two cases further confirms that mNGS is a highly promising tool for diagnosing severe Chlamydia psittaci pneumonia. Compared to traditional methods, mNGS provides a fast, comprehensive, and culture independent pathogen detection scheme, which is crucial for the etiological diagnosis and precise anti infective treatment of difficult and critical pneumonia, as emphasized by Yang [7] and Gao [8]. However, mNGS technology has limitations such as high detection costs, complex interpretation of results, and a lack of globally unified positive threshold standards [9]. In addition, Yuan et al. pointed out that mNGS cannot routinely replace PCR or culture as the gold standard for diagnosing Chlamydia psittaci, but its value is irreplaceable when traditional methods cannot identify the pathogen [4,10].

In summary, the two cases in this report and the reviewed literature emphasize that for severe community-acquired pneumonia patients with respiratory failure, especially those with a history of contact with birds, clinical doctors need to include Chlamydia psittaci pneumonia as an important differential diagnosis. For pneumonia patients with poor empirical treatment and negative routine pathogen detection, mNGS technology should be actively considered to clarify the pathogen.

Sources of Support:
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Interest:
All authors declare that they have no competing interests.

References:

1. File TM Jr, Ramirez JA. Community-Acquired Pneumonia. N Engl J Med 2023 Aug 17;389(7):632-641. (PMID: 37585629)
2. Hogerwerf L, DE Gier B, Baan B, VAN DER Hoek W. Chlamydia psittaci (psittacosis) as a cause of community-acquired pneumonia: a systematic review and meta-analysis. Epidemiol Infect 2017 Nov;145(15):3096-3105. (PMID: 28946931)
3. Tang J, Tan W, Luo L, Xu H, Li N. Application of Metagenomic Next-Generation Sequencing in the Diagnosis of Pneumonia Caused by Chlamydia psittaci. Microbiol Spectr 2022 Aug 31;10 (4):e0238421. (PMID: 35938720)
4. Yuan L, Chen Q, Zhu XY, Lai LM, Zhao R, Liu Y. Evaluation of clinical characteristics and risk factors associated with Chlamydia psittaci infection based on metagenomic next-generation sequencing. BMC Microbiol 2024 Mar 13;24(1):86. (PMID: 38481150)
5. Gu L, Liu W, Ru M, et al. The application of metagenomic next-generation sequencing in diagnosing Chlamydia psittaci pneumonia: a report of five cases. BMC Pulm Med 2020 Mar 17;20(1): 65. (PMID: 32178660)
6. Pendleton KM, Erb-Downward JR, Bao Y, et al. Rapid Pathogen Identification in Bacterial Pneumonia Using Real-Time Metagenomics. Am J Respir Crit Care Med 2017 Dec 15;196(12):1610-1612. (PMID: 28475350)
7. Yang A, Chen C, Hu Y, et al. Application of Metagenomic Next-Generation Sequencing (mNGS) Using Bronchoalveolar Lavage Fluid (BALF) in Diagnosing Pneumonia of Children. Microbiol Spectr 2022 Oct 26;10(5):e0148822. (PMID: 36169415)
8. Gao N, Yin J, Niu N, Hao W, Chen X, Yang T. Comparison of bronchoalveolar lavage fluid mNGS and sputum culture in the clinical application of severe pneumonia. Front Cell Infect Microbiol 2025 Jun 4;15:1593818. (PMID: 40535545)
9. Wang ZY, Li LL, Cao XL, et al. Clinical application of amplification-based versus amplification-free metagenomic next-generation sequencing test in infectious diseases. Front Cell Infect Microbiol 2023 Nov 29;13:1138174. (PMID: 38094744)
10. Hisada K, Hida Y, Kawabata N, et al. Development and evaluation of a novel quenching probe PCR (GENECUBE) assay for rapidly detecting and distinguishing between Chlamydia pneumoniae and Chlamydia psittaci. J Microbiol Methods 2021 May;184: 106212. (PMID: 33781806)