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Case Report

Pharmacist-driven optimization of presumptive psittacosis management: a case report of rapid clinical resolution

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Abstract

Introduction: *Chlamydia psittaci* has a high incidence of pneumonia after infection, but clinical diagnosis still faces challenges due to the lack of specific clinical manifestations and low positive rates in routine testing.

Case presentation: A 60-year-old female patient with community-acquired pneumonia (CAP) failed to respond to initial intravenous antimicrobial therapy with cefmetazole/ciprofloxacin followed by piperacillin-tazobactam/levofloxacin, exhibiting persistent fever and worsening symptoms. Serial laboratory testing revealed progressive elevation of inflammatory markers, with C-reactive protein (CRP) rising from 110.2 to 120.9 mg/L and procalcitonin (PCT) from 1.37 to 2.15 ng/mL. Essential bronchoscopic examination and metagenomic next-generation sequencing (mNGS) could not be performed due to patient refusal, creating a diagnostic deadlock. The clinical pharmacist identified avian exposure during medication rounds, enabling presumptive diagnosis of psittacosis. Immediate pharmacist-initiated interventions included discontinuation of levofloxacin and commencement of targeted oral minocycline therapy. Clinical resolution occurred within 48 hours with defervescence and symptomatic improvement. Subsequent minocycline-induced nausea and diarrhea were effectively managed through pharmacist-instructed co-administration with food. Continuous clinical improvement facilitated discharge on oral minocycline, with follow-up imaging confirming complete resolution of pulmonary infiltrates.

Conclusions: This case underscores the value of pharmacist-led pharmaceutical assessment in uncovering atypical infection etiologies and guiding targeted antimicrobial therapy.

Key words: antimicrobial stewardship; *Chlamydia psittaci*; minocycline; pharmacists.

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Introduction

Community-acquired pneumonia (CAP), as a highly prevalent infectious disease of the respiratory system, often leads to initial empirical treatment failure due to its complex pathogen composition. *Chlamydia psittaci* has a high incidence of pneumonia after infection, but clinical diagnosis still faces challenges due to the lack of specific clinical manifestations and low positive rates in routine testing [1]. Although bronchoalveolar lavage (BAL) combined with metagenomic next-generation sequencing (mNGS) has played a significant role in the etiological detection of *Chlamydia psittaci* [2], its clinical application is limited by poor patient tolerance for invasive procedures and high testing costs. Epidemiological study indicates that nearly 90% of psittacosis cases have a history of exposure to birds or poultry [3], however, the misdiagnosis rate of sporadic cases of psittacosis is even as high as 50–80% worldwide [4]. In recent years, clinical pharmacists, as core members of multidisciplinary teams (MDT), have demonstrated unique value in elucidating mechanisms of treatment failure, and optimizing antimicrobial strategies through systematic pharmaceutical care. This paper reports a case of *Chlamydia psittaci* pneumonia diagnosed through clinical pharmacist intervention, aiming to elucidate the central role of pharmaceutical thinking in integrating clinical-microbiological evidence and resolving diagnostic dilemmas, while exploring the transformative significance of clinical pharmacists in MDT.

Case report

A 60-year-old retired Chinese female presented with acute-onset fever peaking at 39.8 °C on 21 November 2024, without identifiable triggers. She denied significant cough, sputum production, dizziness, headache, nausea, vomiting, abdominal pain, or diarrhea. After ineffective self-administration of an over-the-counter antipyretic (acetaminophen-containing cold remedy, unspecified brand), persistent febrile episodes prompted emergency department visit on 22 November 2024. Physical examination documented body temperature of 38.3 °C with

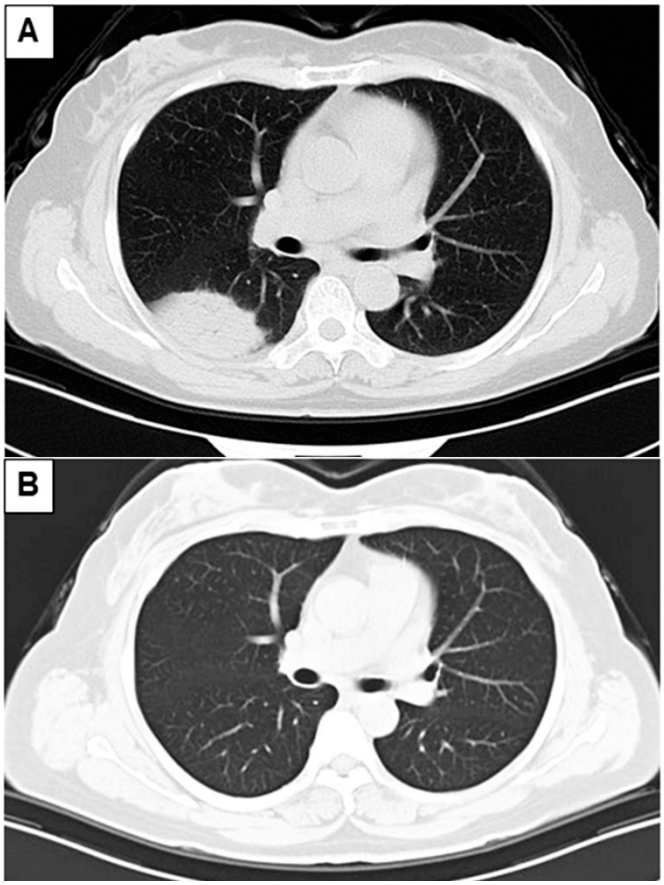
oropharyngeal erythema and edema, without tonsillar enlargement, abdominal tenderness, or diarrhea. Laboratory tests revealed elevated white blood cells (WBC, 11.48 × 10⁹/L) with increased neutrophils (7.68 × 10⁹/L) and lymphocytes within normal range (3.11 × 10⁹/L). Markedly elevated inflammatory markers included C-reactive protein (CRP, 110.2 mg/L; ref: < 10 mg/L) and procalcitonin (PCT, 1.37 ng/mL; ref: < 0.05 ng/mL). Nucleic acid assays for influenza A/B and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) returned negative results, and myocardial enzyme profiles were within normal limits. The emergency physician initiated oral ibuprofen tablets for antipyresis combined with intravenous antibiotics: cefmetazole 2 g qd and ciprofloxacin 0.4 g qd.

After two days of treatment, the patient exhibited no significant symptomatic improvement. A chest computed tomography (CT) scan performed on 24 November 2024 revealed evidence of infection in the right lower lobe (Figure 1A). Given the lack of improvement following emergency management and a concerning clinical trajectory, the patient was admitted to the Department of Respiratory and Critical Care Medicine on the same day. Admission diagnosis was non-severe CAP. On admission, physical examination findings included: temperature 38.4 °C, heart rate 90 beats per minute, respiratory rate 20 breaths per minute, and blood pressure 113/58 mmHg. The patient was alert but appeared fatigued. No enlargement of superficial lymph nodes was detected. Auscultation of the lungs demonstrated mildly coarse breath sounds bilaterally, with moist rales audible in the right lower lung field. The abdomen was soft, non-tender, without rebound tenderness, and Murphy's sign was negative. Past medical history, personal history, and family history were unremarkable.

Six hours after admission, laboratory studies demonstrated normalization of the complete blood count (CBC), electrolyte imbalances, and further elevation of inflammatory markers: CRP at 120.9 mg/L (ref: < 10 mg/L) and PCT at 2.15 ng/mL (ref: < 0.05 ng/mL), increased from prior levels. Hepatic transaminases were elevated, with alanine aminotransferase (ALT) 120 U/L and aspartate aminotransferase (AST) 118 U/L. The working diagnosis remained non-severe CAP. Empiric intravenous therapy with piperacillin/tazobactam 4.5 g q8h and levofloxacin 0.5 g qd was initiated for antimicrobial coverage, supplemented by adjunctive therapies including electrolyte correction and hepatoprotective agents. Arterial blood gas analysis revealed pH 7.43, PaO_2 63.7 mmHg, $PaCO_2$ 33.5 mmHg, and SaO_2 94%, prompting initiation of nasal high-flow oxygen therapy. On 25 November 2024, the patient remained febrile (peak temperature 38.8 °C) with worsening lethargy, new-onset dizziness, and headache. BAL of the right lower lobe with mNGS testing was proposed to identify the causative pathogen, which the patient declined.

During a clinical pharmacist rounding on 26 November 2024, the patient reported persistent intermittent fever peaking at 38.1 °C. The clinical pharmacist elicited a critical epidemiological history: household poultry farming (such as chickens, ducks, geese) and recent exposure to avian feces during cleaning of domestic poultry housing prior to symptom onset. Based on this history, normal to mildly elevated leukocyte counts, progressive inflammatory markers (CRP/PCT), and consolidative chest computed tomography (CT) findings, the clinical pharmacist raised high suspicion for *Chlamydia psittaci* infection,

Figure 1. Serial chest CT imaging findings.



A. Initial scan on 24 November 2024: A consolidative lesion with surrounding ground-glass opacity was observed in the right lower lobe, radiologically consistent with infectious etiology; **B.** Follow-up scan on 8 December 2024: Complete radiographic resolution of the previously noted pulmonary infiltrates, indicating favorable treatment response.

Table 1. Serial inpatient monitoring data.

Date	Temperature (°C)	WBC × 10^9/L (3.50~9.50)	CRP mg/L (0.0~10.0)	PCT ng/mL (0.00~0.05)	ALT U/L (9~35)	AST U/L (14~36)	Anti-infection treatment
22/11/2024	38.3	11.48	110.2	1.37	/	/	Cefmetazole 2 g qd + Ciprofloxacin 0.4 g qd
24/11/2024	38.4	7.02	120.9	2.15	120	118	Piperacillin/tazobactam 4.5 g q8h + Levofloxacin 0.5 g qd
25/11/2024	38.8	/	/	/	/	/	Piperacillin/tazobactam 4.5 g q8h + Levofloxacin 0.5 g qd
26/11/2024	38.1	8.62	129.7	1.65	/	/	Piperacillin/tazobactam 4.5 g q8h + Minocycline 0.1 g q12h
27/11/2024	36.5	/	/	/	/	/	Piperacillin/tazobactam 4.5 g q8h + Minocycline 0.1 g q12h
28/11/2024	36.9	4.67	80.5	0.20	80	67	Minocycline 0.1 g q12h
1/12/2024	36.6	/	/	/	/	/	Minocycline 0.1 g q12h
8/12/2024	36.8	6.11	2.4	0.05	32	40	Minocycline 0.1 g q12h

WBC: white blood counts; CRP: C-reactive protein; PCT: procalcitonin; ALT: alanine aminotransferase; AST: aspartate aminotransferase; '/' indicates data not available.

prompting immediate notification of the attending physician. Concurrently, intravenous levofloxacin was discontinued per pharmacist recommendation, and oral minocycline capsules 0.1g every 12 hours was initiated with a first-dose loading of 0.2 g. The patient achieved afebrile status (temperature ≤ 37.2 °C) with resolved lethargy, dizziness, and headache by 28 November 2024. Given this clinical response, intravenous piperacillin/tazobactam was discontinued while oral minocycline continued at 0.1g q12h. Subsequently, the patient developed minocycline-related gastrointestinal adverse effects (nausea, vomiting, diarrhea). Medication education was provided advising concomitant food intake to mitigate these symptoms. No fever recurrence was documented until 1 December 2024, and the patient requested discharge. Discharge was approved based on improving laboratory parameters, with instructions for continued minocycline therapy and 1-week follow-up chest CT was scheduled. Serial inpatient monitoring data are summarized in Table 1. Follow-up CT on 8 December 2024 demonstrated complete resolution of pulmonary infiltrates (Figure 1B).

Discussion

Chlamydia psittaci is an intracellular parasitic pathogen that can cause zoonotic diseases. Birds and poultry are common hosts, and human infection primarily occurs through inhalation or contact with secretions or excretions from these hosts [5]. The main symptoms of *Chlamydia psittaci* infectious pneumonia include fever, chills, cough, and myalgia [6], along with gastrointestinal symptoms such as vomiting, loss of appetite, and diarrhea in some patients [7]. Chest CT primarily shows varying degrees of exudation and consolidation, with consolidation in a single lower lobe being the most common. Additionally, patchy reticular infiltrates and diffuse ground-glass opacities can also be observed [8]. In this case, the patient's clinical presentation was characterized by fever and headache, with chest imaging revealing a consolidative lesion in the right lower lobe (Figure 1A), which is consistent with the aforementioned reports. However, it should be emphasized that the aforementioned symptoms and imaging manifestations lack sufficient specificity and do not represent typical or characteristic changes of *Chlamydia psittaci* pneumonia. This diagnostic challenge is compounded by the disease's relatively low prevalence, which accounts for only approximately 2.1% of complicated or atypical pulmonary infection cases in China [9], leading to insufficient clinical vigilance among physicians during initial encounters and contributing to the initial diagnostic oversight in this case.

In China, the most prevalent bacterial pathogens in adult CAP are *Streptococcus pneumoniae* and *Mycoplasma pneumoniae*, with other common isolates including *Haemophilus influenzae*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* [10]. Therefore, the emergency and attending physicians in this case initially followed standardized guidelines that cover this likely pathogen spectrum [11], and empirically adopted an anti-infective regimen combining β-lactam antibiotics with quinolones. However, this treatment regimen failed to achieve satisfactory clinical efficacy. At this point, the clinical pharmacist successfully obtained crucial epidemiological information by participating in ward rounds and conducting a detailed pharmaceutical consultation, including the patient's history of raising poultry such as chickens, ducks, and geese at home, as well as cleaning the poultry housing and having close contact with poultry excrement prior to the onset of symptoms. The acquisition of this information became the critical turning point in reversing the diagnostic dilemma for the patient. Based on this critical clue, the clinical pharmacist promptly alerted the clinical team to strongly suspect *Chlamydia psittaci* infection and recommended adjusting the anti-infection regimen to minocycline for targeted treatment. Ultimately, the patient recovered following the targeted administration of minocycline.

The Infectious Diseases Society of America/American Thoracic Society (IDSA/ATS) CAP guidelines clearly recommend tetracyclines as the preferred antimicrobial, with macrolides as the alternative option for the treatment of *Chlamydia psittaci* infection [12]. Studies have reported that compared to tetracyclines and macrolides, quinolones demonstrate a lower clinical response rate and suboptimal efficacy in the treatment of *Chlamydia psittaci* pneumonia [13-15]. This likely explains the failure to achieve the expected clinical response with the initial 4-day course of ciprofloxacin and levofloxacin antimicrobial therapy in this case. Regarding the dosing strategy, a regimen of doxycycline or minocycline (0.1 g q12h with a loading dose) is the preferred treatment for psittacosis [16,17]. Furthermore, omadacycline, a novel therapeutic option administered at 0.1 g qd with a loading dose, is characterized by its favorable pharmacokinetic profile, including superior lung tissue concentration and no requirement for dose adjustment in patients with hepatic or renal impairment [18]. While omadacycline might have been a more suitable choice for this patient with hepatic injury, it was unavailable in the hospital's formulary. Considering that the patient's hepatic injury was mild and actively managed with hepatoprotective agents, the clinical pharmacist recommended administering a loading dose of minocycline. The rationale for this regimen lies in rapidly achieving plasma drug concentrations that exceed the pathogen's minimum inhibitory concentration (MIC), thereby facilitating rapid control of clinical symptoms [19]. This strategy proved effective, as evidenced by the patient's defervescence to 37 °C by 6:00 PM on 26 November 2024 after starting minocycline at 10:00 AM on that day, with no recurrence of fever throughout the subsequent clinical course and with corresponding normalization of liver function parameters (Table 1). Furthermore, regarding the gastrointestinal symptoms experienced by the patient during minocycline therapy, the clinical pharmacist judged them to be probable adverse drug reactions associated with minocycline, and instructed the patient to administer minocycline concomitantly with food. This intervention proved effective in significantly alleviating the gastrointestinal adverse effects [20], thereby enhancing the patient's medication adherence, and ensuring the completion of the full course of antimicrobial therapy, which ultimately resulted in the patient's recovery.

Based on the comprehensive analysis above, the clinical pharmacist demonstrated tripartite role transcendence in this case: as a diagnostic collaborator, by bridging critical epidemiological history gaps to propel presumptive diagnosis; as a therapeutic strategist, by recommending guideline-preferred tetracyclines; and as a medication safety guardian, by managing adverse drug reactions to ensure treatment continuity. The multifaceted contribution was pivotal to the successful resolution of this case. Although a key limitation was the absence of confirmatory microbiological testing due to patient refusal, this case powerfully exemplifies the efficacy of pharmaceutical thinking in deciphering diagnostic dilemmas and enabling precision pharmacotherapy within the antimicrobial stewardship team.

Conclusions

This case underscores the value of pharmacist-led pharmaceutical assessment in uncovering atypical infection etiologies and guiding targeted antimicrobial therapy.

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Ethics approval and consent to participate

Ethical approval not required for this single case report as per institutional policy. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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Conflict of interest

No conflict of interest is declared.

References

1. Liu S, Cui Z, Carr MJ, Meng L, Shi W, Zhang Z (2023) *Chlamydia psittaci* should be a notifiable infectious disease everywhere. Lancet Microbe 4: e62–e63. doi: 10.1016/S2666-5247(22)00306-8.
2. Tang J, Tan W, Luo L, Xu H, Li N (2022) Application of metagenomic next-generation sequencing in the diagnosis of pneumonia caused by *Chlamydia psittaci*. Microbiol Spectr 10: e0238421. doi: 10.1128/spectrum.02384-21.
3. Hulin V, Bernard P, Vorimore F, Aaziz R, Cléva D, Robineau J, Durand B, Angelis L, Siarkou VI, Laroucau K (2015) Assessment of *Chlamydia psittaci* shedding and environmental

contamination as potential sources of worker exposure throughout the mule duck breeding process. Appl Environ Microbiol 82: 1504–1518. doi: 10.1128/AEM.03179-15.
4. Sheng Y, Jin LY, Li N, Zhang Y, Shi YJ (2025) Global prevalence of psittacosis in outbreaks: a systematic review and meta-analysis. BMC Public Health 25: 2010. doi: 10.1186/s12889-025-21612-y.
5. Hogerwerf L, Roof I, de Jong MJK, Dijkstra F, van der Hoek W (2020) Animal sources for zoonotic transmission of psittacosis: a systematic review. BMC Infect Dis 20: 192. doi: 10.1186/s12879-020-4918-y.
6. Hogerwerf L, DE Gier B, Baan B, Van der Hoek W (2017) *Chlamydia psittaci* (psittacosis) as a cause of community-acquired pneumonia: a systematic review and meta-analysis. Epidemiol Infect 145: 3096–3105. doi: 10.1017/S0950268817002060.
7. Vande WY, Versteele C, Thijs E, De Spiegeleer A, Boelens J, Vanrompay D, Van Braeckel E, Vermaelen K (2018) An unusual presentation of a case of human psittacosis. Respir Med Case Rep 23: 138–142. doi: 10.1016/j.rmcr.2018.01.010.
8. Xiao Q, Shen W, Zou Y, Dong S, Tan Y, Zhang X, Yao L, Li Q, Pei W, Wang T (2021) Sixteen cases of severe pneumonia caused by *Chlamydia psittaci* in South China investigated via metagenomic next-generation sequencing. J Med Microbiol 70. doi: 10.1099/jmm.0.001456.
9. Huang W, Wang F, Cai Q, Xu H, Hong D, Wu H, Zhou L, Hu L, Lu Y (2023) Epidemiological and clinical characteristics of psittacosis among cases with complicated or atypical pulmonary infection using metagenomic next-generation sequencing: a multi-center observational study in China. Ann Clin Microbiol Antimicrob 22: 80. doi: 10.1186/s12941-023-00631-w.
10. Li ZJ, Zhang HY, Ren LL, Lu QB, Ren X, Zhang CH, Wang YF, Lin SH, Zhang XA, Li J, Zhao SW, Yi ZG, Chen X, Yang ZS, Meng L, Wang XH, Liu YL, Wang X, Cui AL, Lai SJ, Jiang T, Yuan Y, Shi LS, Liu MY, Zhu YL, Zhang AR, Zhang ZJ, Yang Y, Ward MP, Feng LZ, Jing HQ, Huang LY, Xu WB, Chen Y, Wu JG, Yuan ZH, Li MF, Wang Y, Wang LP, Fang LQ, Liu W, Hay SI, Gao GF, Yang WZ (2021) Chinese Centers for Disease Control and Prevention (CDC) etiology of respiratory infection surveillance study team. Etiological and epidemiological features of acute respiratory infections in China. Nat Commun 12: 5026. doi: 10.1038/s41467-021-25120-6.
11. Cao B, Huang Y, She DY, Cheng QJ, Fan H, Tian XL, Xu JF, Zhang J, Chen Y, Shen N, Wang H, Jiang M, Zhang XY, Shi Y, He B, He LX, Liu YN, Qu JM (2018) Diagnosis and treatment of community-acquired pneumonia in adults: 2016 clinical practice guidelines by the Chinese Thoracic Society, Chinese Medical Association. Clin Respir J 12: 1320–1360. doi: 10.1111/crj.12674.
12. Metlay JP, Waterer GW, Long AC, Anzueto A, Brozek J, Crothers K, Cooley LA, Dean NC, Fine MJ, Flanders SA, Griffin MR, Metersky ML, Musher DM, Restrepo MI, Whitney CG (2019) Diagnosis and treatment of adults with community-acquired pneumonia. an official clinical practice guideline of the American Thoracic Society and Infectious Diseases Society of America. Am J Respir Crit Care Med 200: e45–e67. doi: 10.1164/rccm.201908-1581ST.
13. de Boeck C, Dehollogne C, Dumont A, Spierenburg M, Heijne M, Gyssens I, Van der Hilst J, Vanrompay D (2016) Managing a cluster outbreak of psittacosis in Belgium linked to a pet shop visit in The Netherlands. Epidemiol Infect 144: 1710–1716. doi: 10.1017/S0950268815003106.
14. Ni Y, Zhong H, Gu Y, Liu L, Zhang Q, Wang L, Wan B, Chen S, Cao M, Xu J, Chen C, Chen Y, Sun S, Ji L, Sun W, Wang C, Yang J, Lu X, Shi B, Feng C, Su X (2023) Clinical features, treatment, and outcome of psittacosis pneumonia: a multicenter study. Open Forum Infect Dis 10: c518. doi: 10.1093/ofid/ofac518.
15. Dembek ZF, Mothershead JL, Owens AN, Chekol T, Wu A (2023) Psittacosis: an underappreciated and often undiagnosed disease. Pathogens 12: 1165. doi: 10.3390/pathogens12091165.
16. Yin Q, Li Y, Pan H, Hui T, Yu Z, Wu H, Zhang D, Zheng W, Wang S, Zhou Z, Xu C, Wu W, Tong Y, Wang H, Pan H (2022) Atypical pneumonia caused by *Chlamydia psittaci* during the COVID-19 pandemic. Int J Infect Dis 122: 622–627. doi: 10.1016/j.ijid.2022.07.027.
17. Cheng YJ, Lin KY, Chen CC, Huang YL, Liu CE, Li SY (2013) Zoonotic atypical pneumonia due to *Chlamydophila psittaci*: first reported psittacosis case in Taiwan. J Formos Med Assoc 112: 430–433. doi: 10.1016/j.jfma.2012.08.017.
18. Flarakos J, Du Y, Gu H, Wang L, Einolf HJ, Chun DY, Zhu B, Alexander N, Natrillo A, Hanna I, Ting L, Zhou W, Dole K, Sun H, Kovacs SJ, Stein DS, Tanaka SK, Villano S, Mangold JB (2017) Clinical disposition, metabolism and in vitro drug-drug interaction properties of omadacycline. Xenobiotica 47: 682–696. doi: 10.1080/00498254.2016.1213465.
19. Craig WA (1998) Pharmacokinetic/pharmacodynamic parameters: rationale for antibacterial dosing of mice and men. Clin Infect Dis 26: 1–12. doi: 10.1086/516284.
20. Smith K, Leyden JJ (2005) Safety of doxycycline and minocycline: a systematic review. Clin Ther 27: 1329–1342. doi: 10.1016/j.clinthera.2005.09.005.