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Chlamydia psittaci pneumonia transmitted by a pet rabbit： a case report

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Case Report

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Abstract

Background Chlamydia psittaci pneumonia(CPP) is a zoonotic disease. Its true incidence is underestimated due to nonspecific symptoms and limited routine testing, and only 30%–50% of confirmed cases report bird exposure. Clinical features range from mild flu-like illness to severe atypical pneumonia, often with extrapulmonary involvement (liver, CNS, heart, kidneys). Delayed diagnosis may lead to ARDS, multi-organ failure, and death.

Case presentation A 36-year-old female presented with a 5-day history of fever (peak 39.7°C), cough, and yellow sputum, accompanied by chills, headache, myalgia, arthralgia, fatigue, and chest tightness. Prior treatment with oseltamivir, Fenghan Granules, antipyretics, antivirals, and levofloxacin was ineffective. Physical examination: temperature 39.2°C, pulse 112 beats/min, respiration 20 breaths/min, SpO_2 98%, clear bilateral breath sounds without dry or moist rales. WBC count was normal (7.41×10^9/L) and SAA was elevated (> 320.00 ng/ml). Chest CT showed patchy opacities in the left lower lobe. Mycoplasma pneumoniae pneumonia was considered and treated with moxifloxacin, but recurrent high fever and significant headache persisted. The patient had purchased three pet rabbits one month earlier, earlier, all of which died within days; she had been responsible for feeding and cleaning them. As tularemia could not be excluded, the antibiotic regimen was changed to ceftriaxone plus doxycycline. Blood mNGS revealed 1 sequence read and bronchoalveolar lavage fluid 119.42 sequence reads for Chlamydia psittaci. The rabbits had been purchased at a bird and flower market with a large number of birds present. EEG was normal; the patient declined lumbar puncture and brain MRI. Fever and headache resolved after adjustment of the antibiotic regimen, and she was discharged 3 days later. Repeat chest CT before discharge showed resolution of the pneumonia. Doxycycline was continued for 4 days after discharge, and the patient remained asymptomatic at follow-up.

Conclusion This case demonstrates that CPP can occur without direct bird exposure, as pet mammals from bird-contaminated environments may act as mechanical vectors. Early diagnosis relies on molecular tools such as mNGS/tNGS when routine tests are negative, and doxycycline remains the first-line treatment. A thorough, repeated, and non-judgmental exposure history is critical, since patients may not spontaneously report relevant animal contacts.

Background

Chlamydia psittaci (CP) pneumonias, is a zoonotic disease caused by Chlamydia psittaci(Cps)[2.3]. The pathogen exhibits a unique biphasic developmental cycle: the metabolically inactive but infectious elementary body (EB) can survive in the environment for months[2,4].Human infection occurs predominantly through inhalation of aerosolized organisms from respiratory secretions, feces, or feather dust of infected birds, including parrots, pigeons, and poultry such as chickens, ducks, and turkeys[6,12,13]. However, the true incidence is likely underestimated due to nonspecific clinical presentations, lack of routine diagnostic testing, and varying sensitivity of available assays[2,4]. Notably, the proportion of confirmed cases with a clear history of bird exposure is only 30%–50%, further

complicating clinical recognition[4]. Clinical manifestations are highly variable, ranging from mild flu-like illness to severe atypical pneumonia. Chlamydia psittaci (CP) pneumonias's common symptoms include acute onset of high fever, chills, severe headache, myalgia, and dry cough[4,7]. Importantly, C. psittaci infection frequently involves extrapulmonary organs, including the liver (elevated transaminases), central nervous system (meningitis, encephalitis), cardiovascular system (myocarditis, endocarditis), and kidneys, reflecting its systemic nature[1,7].Nevertheless, early diagnosis remains challenging, and delayed recognition can lead to rapid progression to acute respiratory distress syndrome (ARDS), multi-organ failure, and death. This case report describes a patient with C. psittaci pneumonia who had no known history of bird exposure, experienced a challenging and protracted diagnostic course, but ultimately had a favorable prognosis, aiming to raise clinical awareness and highlight diagnostic and therapeutic considerations for this often-overlooked pathogen.

Case presentation

A 36-year-old unemployed female presented with a 5-day history of fever, cough and yellow sputum production. She got fever with a peak temperature of 39.7°C accompanied by chills, headache, generalized myalgia, arthralgia, fatigue and chest tightness that relieved after fever subsided. Self-administered oseltamivir brought no relief, and subsequent treatment with Fenghan Granules, antipyretics, antivirals and levofloxacin at a local clinic was ineffective. Chest CT obtained in our emergency department confirmed left lung inflammation.She has a past medical history of cesarean section. Physical examination: Temperature 39.2°C, Pulse 112 beats per minute, Respiration 20 breaths per minute, SpO_2 98%. Clear bilateral lung breath sounds, no dry or moist rales heard.Evaluation at hospital showed normal infection markers including WBC count (7.41×10^9/L), SAA (> 320.00 ng/ml), as well as normal results for other basic parameters (Table 1). Chest CT revealed Patchy opacities in the left lower lobe, suggestive of inflammation (Fig. 1a-b).Based on the common pathogens of community-acquired pneumonia in China, combined with the patient's clinical manifestations and laboratory findings, Mycoplasma pneumoniae pneumonia is considered highly likely, and moxifloxacin is therefore administered for anti-infective therapy.The patient continues to have recurrent high fever with significant headache. Upon further inquiry into the medical history, it was found that one month before admission, the patient had purchased three pet rabbits at a market and kept them at home, all of which died (the first died on the same day, the second died after 2 days, and the third died after 3–4 days). The patient was responsible for feeding and cleaning the rabbits. Consultations with the departments of Neurology, Infectious Diseases, and Pharmacy were requested. Since tularemia cannot be ruled out, the antibiotic regimen was changed to ceftriaxone plus doxycycline for anti-infective therapy.Further examinations including blood cultures and bronchoscopy were performed. Subsequently, blood mNGS revealed 1 sequence read for Chlamydia psittaci, and the bronchoalveolar lavage fluid(BALF) showed 119.42 sequence reads for Chlamydia psittaci (Tables 2 and 3).Upon further questioning, the patient revealed that the pet rabbits had been purchased at a bird and flower market, where a large number of birds were present. Given that Chlamydia psittaci infection frequently involves extrapulmonary organs, and in view of the patient's headache, an electroencephalogram (EEG) was performed, which showed normal

findings. The patient declined lumbar puncture and brain magnetic resonance imaging (MRI). After adjustment of the antibiotic regimen, the patient became afebrile and the headache resolved; the patient was discharged 3 days later. Prior to discharge, repeat chest CT showed signs of resolution of the pneumonia(Fig. 1c-d). Following discharge, the patient received doxycycline for an additional 4 days. At follow-up, the patient reported no further discomfort.

Table 1
Laboratory test results

Laboratory test results	Result	Reference Interval
White blood cell ($\times 10^9$ /L)	6.45	3.50–0.50
Neutrophil percentage(%)	87.2	40–75
Procalcitonin (ng/ml)	0.155	<0.05
Serum amyloid A (mg/l)	>320	0.00–10.00
blood potassium(mmol/l)	3.38	3.50–5.30
blood sodium(mmol/l)	138.4	137.0–147.0
High-sensitivity cardiac troponin T (pg/ml)	<3.00	<14.00
Albumin(g/l)	35.99	40.00–55.00
Alanine Aminotransferase (U/L)	31	7–40
Aspartate Aminotransferase (U/L)	25	13–35
Respiratory virus nucleic acid test*	Negative	Negative
*Respiratory virus nucleic acid tests include tests for influenza A virus, influenza B virus, respiratory syncytial virus, adenovirus, human rhinovirus, Mycoplasma pneumoniae, and the novel coronavirus.		

Table 2
Targeted next-generation sequencing of BALF

Microorganisms	Specific Read Counts
Chlamydia psittaci	119.42

Table 3
Metagenomic Next-Generation Sequencing of blood

Microorganisms	Specific Read Counts	Positive reference interval
Chlamydia psittaci	1	≥ 1
Pneumococcus	5	≥ 8
Human papillomavirus type 2	1	≥ 3

Disscussion

A systematic review and meta-analysis estimated that C. psittaci accounts for approximately 1.03% (95% CI 0.79–1.30) of community-acquired pneumonia (CAP) cases[5].In recent years, the increasing popularity of bird keeping, coupled with the widespread availability and clinical application of advanced molecular diagnostic techniques such as next-generation sequencing (NGS), has substantially improved the detection rate of Chlamydia psittaci pneumonia. In the present case, although the patient had no direct contact with parrots or other psittacine birds, she had repeatedly purchased rabbits from a local bird and pet market. Notably, each rabbit died shortly after being brought home. We postulate that the first rabbit acquired was asymptomatically infected with C. psittaci and, following its death, inadequate environmental decontamination of the housing area led to aerosolization of infectious organisms from contaminated excreta or carcass debris, which were subsequently inhaled by the patient, ultimately resulting in overt pulmonary infection. Although rabbits are not considered natural reservoirs, this case adds to the limited evidence supporting non-avian transmission vectors.

The diagnostic journey in this case was protracted and illustrative of the limitations of conventional microbiological approaches. The patient initially received moxifloxacin—a fluoroquinolone with documented in vitro activity against atypical pathogens—but showed no clinical response. Multiplex PCR for common respiratory pathogens was negative, a finding consistent with the limitations of targeted assays in detecting C. psittaci

The diagnosis was ultimately established by BALF tNGS and boold mNGS, which detected 119.42 specific reads of C. psittaci in bronchoalveolar lavage fluid (BALF) and 1 read in blood. This technology offers several distinct advantages over traditional methods such as culture (labor-intensive and requires biosafety level 3 facilities), serology (limited sensitivity in the early stage and reliance on paired sera), and targeted PCR (may fail to detect atypical strains or is not routinely available). NGS provides unbiased, comprehensive, and rapid pathogen identification, making it particularly valuable in cases with atypical presentations or those that fail to respond to standard empirical therapy[1,8]. However, clinicians must interpret low read counts cautiously, as environmental contamination or background noise may lead to false-positive results; clinical correlation remains paramount.

Given the initial presentation of fever, pneumonia, and headache in a patient with rabbit exposure, several zoonotic pathogens entered the differential diagnosis. The most pertinent consideration was tularemia (Francisella tularensis), given the direct contact with dead rabbits. Tularemia can manifest as pneumonic illness with high fever, headache, and myalgia, and is classically associated with lagomorph exposure. However, the absence of ulceroglandular lesions or tick bite history made this diagnosis less likely. Other zoonoses considered included Q fever (Coxiella burnetii), typically linked to exposure to parturient cats or livestock, and leptospirosis, though neither was supported by the clinical picture. This case underscores the importance of considering a wide array of zoonotic pathogens in patients with unusual animal exposure histories, and emphasizes that the epidemiological link may be indirect, requiring careful and repeated history-taking[8].

The patient's initial non-response to moxifloxacin deserves discussion. While fluoroquinolones have been used as alternative agents for psittacosis, several studies have reported variable efficacy and treatment failures. In contrast, tetracyclines—particularly doxycycline—remain the gold standard, with rapid defervescence typically observed within 48–72 hours of initiation[1]. The prompt clinical and radiographic improvement following the switch to doxycycline in our patient further supports its superiority. For patients with contraindications to tetracyclines, macrolides such as azithromycin are recommended alternatives, although they are considered less potent.**Omadacycline**, a novel aminomethylcycline tetracycline, has emerged as a promising new treatment option due to its high lung tissue concentrations and favorable safety profile[9]. A 2024 retrospective study demonstrated the efficacy and safety of omadacycline in treating C. psittaci pneumonia[10], and multiple case reports have confirmed its effectiveness in severe cases[11].For critically ill patients, combination therapy with tetracyclines plus macrolides or fluoroquinolones may be considered, along with organ support including mechanical ventilation and even extracorporeal membrane oxygenation (ECMO) when necessary.

This case carries several important implications. From a clinical perspective, it reinforces that a thorough epidemiological history is indispensable—patients may not volunteer details about pet mammals, and clinicians must actively inquire about all animal contacts. The patient's reticence in revealing the rabbit purchases until repeated questioning highlights a common challenge in clinical practice. From a public health standpoint, the case raises concerns about zoonotic spillover risks in pet markets where multiple species are housed in close proximity. Regulatory oversight and sanitation protocols may be warranted to mitigate such risks.

Several limitations should be acknowledged. The patient declined lumbar puncture and brain MRI, limiting our ability to fully assess for central nervous system involvement. Environmental sampling of the rabbit enclosures or market was not conducted, so the exact transmission route remains speculative. Despite these limitations, the clinical scenario, the consistent epidemiological link, and molecular confirmation by mNGS and tNGS provide compelling evidence for C. psittaci pneumonia in this case.

Conclusion

We present a case of Chlamydia psittaci pneumonia transmitted via pet rabbits from a bird-contaminated market environment in a patient without direct avian exposure. This case underscores that C. psittaci infection should be considered even in the absence of typical bird contact; pet mammals from environments with high avian density may serve as mechanical vectors or intermediate hosts. mNGS/tNGS is indispensable for timely pathogen identification in cases with negative routine workups, enabling targeted antimicrobial therapy and improved outcomes. Doxycycline remains the first-line therapy for psittacosis. A thorough, repeated, and non-judgmental exposure history is critical, as patients may not voluntarily disclose relevant animal contacts. In an era of increasing human-animal interaction and evolving diagnostic technologies, maintaining a high index of suspicion for zoonotic pathogens—coupled with judicious use of molecular diagnostics—will be essential to reduce diagnostic and therapeutic delays in psittacosis and improve patient outcomes.

Declarations

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Authors' contributions

.YYL and HY contributed to the diagnosis and treatment of the disease, while YYL and BYQ contributed to the drafting of the manuscript and the preparation of the figures. BYQ and HY contributed equally to this work. All authors reviewed the manuscript.

Ethics approval and consent to participate

This case report was approved by the Research Ethics Committee of Yantai Yuhuangding Hospital (approval number: [K2026-694]). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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Figures

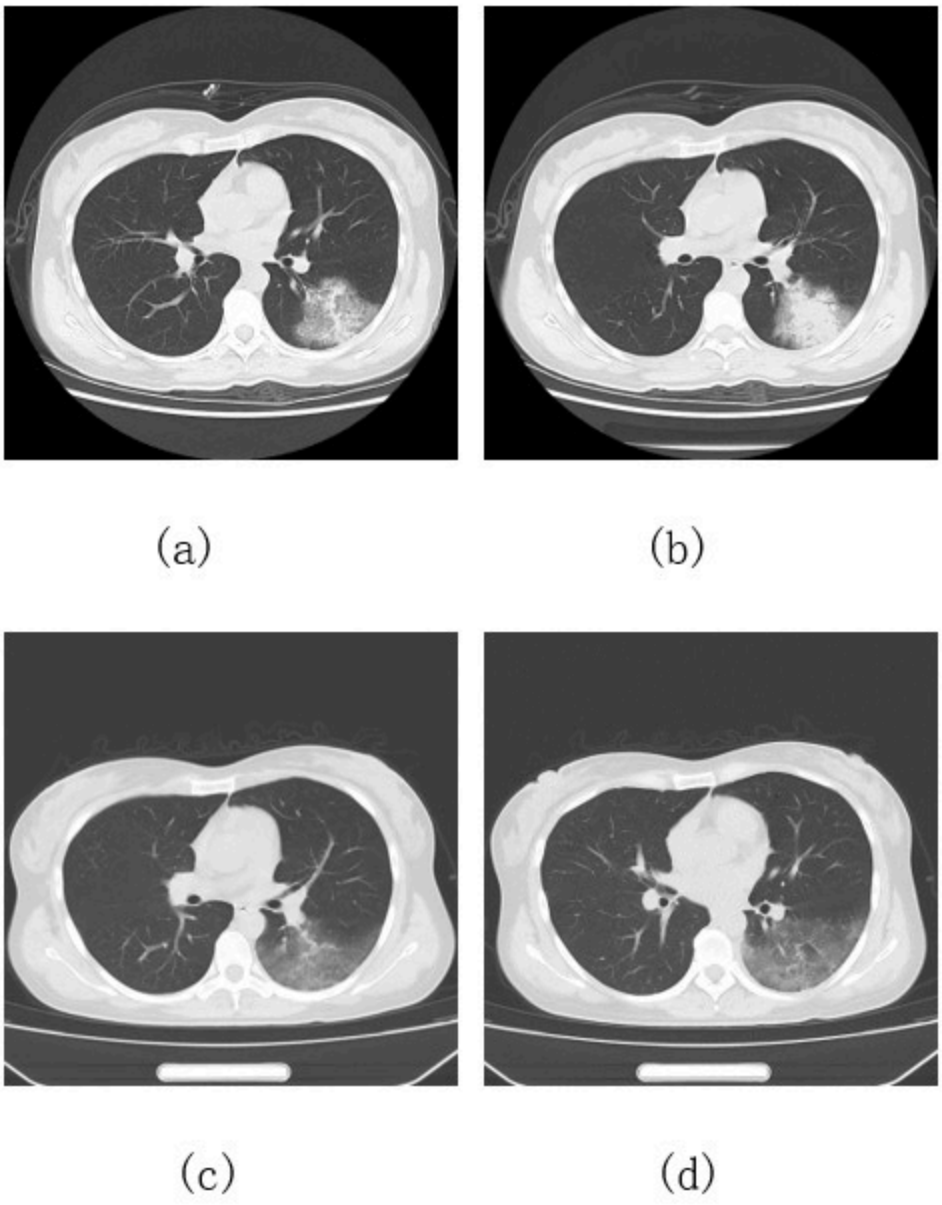


Figure 1

A series of chest CT images show changes in lung lesions. (a, b) show the baseline chest CT taken at the patient's first visit. (c, d) show the chest CT before discharge, with reduced lung inflammation and lesion

absorption. Abbreviation: CT, computed tomography.