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Case report

An unusual presentation of a case of human psittacosis

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ABSTRACT

Background: *Chlamydia psittaci* is a gram-negative, obligate intracellular organism. Birds are the main reservoir, but also non-avian domestic animals and humans can be infected. In humans it mostly causes respiratory infections due to occupational exposure with varying severity. Sensitive and specific diagnostic tests are needed to define psittacosis in humans as these tests also allow rapid tracing of the animal source. However, diagnosis in humans is often based on time-consuming culture techniques and antibody detection assays as in many countries, the existing molecular diagnostic tests for psittacosis are not reimbursed by the public health insurance.

Case presentation: An 82-year old female was referred to the hospital with a non-productive cough since four weeks and since one week fever up to 39 °C, myalgia, generalized skin rash, acral edema and generalized weakness under treatment with moxifloxacin. Blood analysis showed signs of inflammation with mild eosinophilia. Chest CT showed multiple peripheral ground glass opacities with consolidation in both lungs. Pulmonary function testing only showed a mild decrease in diffusion capacity. Viral and bacterial serology were negative. As the patient kept a pet parakeet for over ten years, a nested PCR for *C. psittaci* was performed on a nasopharyngeal swab of the patient and on feces of the parakeet. Both returned positive for the same genotype. Genotyping was performed by a genotype-specific real-time PCR. The patient fully recovered after a ten-day course of azithromycin.

Conclusion: Due to non-specific signs during psittacosis, early detection of the infection and differentiation from hypersensitivity pneumonitis can be challenging. Culture and antibody titers for *C. psittaci* have a lower sensitivity than PCR-testing due to several factors. We present a case of human psittacosis (presenting as pneumonia) with diagnosis based on clinical findings confirmed by means of nested PCR. This case suggests the added value of PCR in suspect cases despite negative serology. Our current paper underlines the need for a broader implementation of PCR for early diagnosis of human psittacosis and thus early initiation of correct antibiotic treatment with reduction of morbidity and mortality.

1. Case description

An 82-year old female patient was referred to the hospital with the following symptoms that had lasted for a week: fever up to 39 °C, myalgia, a generalized skin rash, edema of the hands and feet and generalized weakness. These symptoms were preceded by bronchitis with non-productive cough that developed 4 weeks before, for which she had been treated with oral amoxicillin during 1 week. At the time of admission she was taking oral moxifloxacin.

There were no other people in her environment with similar complaints. Her medical history included a cholecystectomy, a hysterectomy *per vaginam*, and a pyelonephritis. There were no specific familial antecedents. There was no history of nicotine, alcohol or drug abuse. There were no known allergies. She had been keeping a small parakeet (*Pyrrhura molinea molinea*) as a pet for over 10 years. The bird did not show any signs of illness, nor had he been ill in the past.

2. Clinical examination

On admission, the patient had a systolic blood pressure of 140 and a diastolic blood pressure of 70 millimeter of mercury, a heart rate of 77 beats per minute, an axillar temperature of 37.8 °C and a blood oxygen level of 96% on pulse oximetry. General inspection showed generalized erythema and diffuse edema, most notably on the limbs and trunk

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List of abbreviations

CRP	C-reactive protein
CT	computed tomography
FEV1	forced expiratory volume in 1 second
FVC	forced vital capacity
DRESS	drug reaction with eosinophilia and systemic symptoms
PCR	polymerase chain reaction
ompA	outer membrane protein A
MOMP	major outer membrane protein

(Fig. 1). Fine inspiratory crackles could be heard across both lower lung fields. Further clinical examination showed no abnormalities.

3. Technical investigations

Blood analysis showed an elevated C-reactive protein (CRP) (166.7 mg/L) and a sedimentation rate of 57 mm/h. There was limited leukocytosis (10300/μL) and an elevated eosinophilic count (309/μL). Liver enzymes were elevated, with an SGOT of 69 U/L, an SGPT of 88 U/L, a gamma-GT of 115 U/L and alkaline phosphatase of 414 U/L. Bilirubin levels were normal. Auto-immune serology including rheumatoid factor, anti-Cyclic Citrullinated Peptide antibodies, Anti-Nuclear Factor and Antineutrophil Cytoplasmic Antibodies were negative. Viral serology including *Cytomegalovirus,* measles, *Influenza A* and *B*, *Varicella zoster*, *Adenovirus*, *Herpes simplex* and *Enteroviridae* was negative. Bacterial serology including *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* returned negative as well (Table 1).

Chest X-ray revealed a diminished transparency of the perihilar lung tissue, and on the profile incidence an ill-defined pneumonic infiltrate could be discerned at the posterobasal region (Fig. 2).

Computed Tomography (CT) scan of the chest was performed, which clearly showed multiple peripheral ground-glass opacities with consolidation in both lungs (Fig. 3). Pulmonary function tests showed a normal Forced Vital Capacity (FVC), FEV1 (Forced Expiratory Volume in 1 second) and FEV1/FVC (Tiffeneau Index) and a mild decrease in diffusion capacity (77% of expected value). Transthoracic cardiac echography and abdominal echography revealed no abnormalities. A Doppler ultrasound of the lower limbs showed only diffuse subcutaneous edema, no signs of deep venous thrombosis.

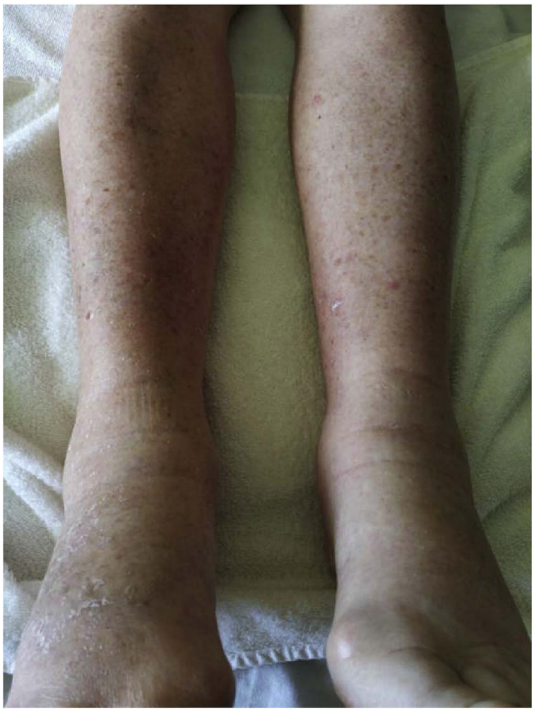

Fig. 1. Edema of the lower limbs with diffuse maculopapular rash.

Urine culture, sputum culture and repeated aerobic and anaerobic blood cultures revealed no specific pathogen. *Legionella* antigen testing on urine was negative.

4. Differential diagnosis

In summary, this patient was admitted to the hospital with a recent history of non-productive cough progressing into a generalized condition with fever, myalgia, diffuse rash and edema of the limbs. Imaging showed diffuse patchy infiltrates on both lungs. Blood sampling revealed CRP elevation and mild eosinophilia, while routine virological, bacteriological and auto-immune serology were negative. The following entities were considered in the differential diagnosis:

4.1. Atypical pneumonia

The term 'atypical pneumonia' originates from descriptions in the early part of the last century of a community-acquired pneumonia syndrome distinct from the typical features of acute illness with fever and mucopurulent sputum. It is characterized traditionally by initial systemic complaints, relatively mild respiratory symptoms and scant sputum production. Progression to an illness of varying severity with possible extrapulmonary involvement and unresponsiveness to penicillin can occur. Among atypical pathogens, *Mycoplasma pneumoniae*, *Legionella* spp., *Chlamydia pneumoniae*, *Chlamydia psittaci* and *Coxiella burnetii* are considered key pathogens in this concept [1].

4.2. Hypersensitivity pneumonitis

Hypersensitivity pneumonitis, also called extrinsic allergic alveolitis, is a respiratory condition involving the lung parenchyma and more specifically the alveoli, terminal bronchioli and alveolar interstitium. The underlying cause is a delayed allergic reaction secondary to repeated and prolonged inhalation of organic dust or other substances. Hypersensitivity pneumonitis can be divided in an acute, subacute and chronic type, depending on the intensity and the frequency of exposure to the causative antigen [2]. With respect to our patient, exposure to organic dust is documented in the form of avian feces-derived dust. She was keeping a pet parakeet for over 10 years and regularly cleaning the bird's cage, which would predispose her to immune sensitization and the development of hypersensitivity pneumonitis. Her symptoms, including fever and myalgia, are compatible with the acute/subacute

Table 1
Routine serology results showing absence of acute humoral response to viral or atypical respiratory pathogens.

	IgG	IgM
Viral Serology		
CMV	−	−
Measles	+	−
Adenovirus	+	−
Influenza A	−	−
Influenza B	+	−
Varicella Zoster	+ (612 IU/mL)	−
Herpes Simplex	+	−
Epstein Barr	+ (105 U/mL)	−
Enterovirus	−	−
Bacterial Serology		
Mycoplasma pneumoniae	−	−
Chlamydia pneumoniae	−	−
Coxiella burnetti	−	−
Chlamydia psittaci	−	−