

## Psittacosis Causing Acute Respiratory Distress Syndrome (ARDS)

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### Abstract

*Chlamydia psittaci* is the causative agent of psittacosis. The illness varies from a mild disease to a fatal systemic illness. In recent years the role of *C. psittaci* causing atypical pneumonia has become more appreciated. Here we present a severe psittacosis case resulting in acute respiratory distress syndrome (ARDS) in a woman which had contact with a pet cockatiel. Chest computed tomography scan demonstrated extensive air-space disease interspersed by air-bronchograms in the dependend portions of both lower lobes. Focal areas of consolidation were also observed in the middle and superior lobes. The diagnosis was suggested on the basis of epidemiologic criteria of exposure to birds and confirmed by a serological test revealing high titers of IgG by MIF assay. In these cases psittacosis should be considered in the differential diagnosis.

**Keywords:** Atypical pneumonia; Chlamydiosis; Pet birds; Zoonosis

### Introduction

The acute respiratory distress syndrome (ARDS) is a major cause of acute respiratory failure. Therefore, early recognition of this syndrome and application of demonstrated therapeutic interventions are essential to change the natural course of this devastating entity [1]. Severe respiratory failure can be caused by atypical pathogens, including *Chlamydia psittaci*, the causative agent of human psittacosis [2]. Infection with *C. psittaci* usually occurs when a person inhales organisms that have been aerosolized from dried feces or respiratory tract secretions of infected birds. In humans, zoonotic transfer may result in subclinical infection, manifesting either as a 'flu-like' illness or as a potentially lethal pneumonia. With early diagnosis and appropriate treatment, patients presenting a case of psittacosis usually have a good prognosis [3]. On the other hand, delays in diagnosis and treatment may lead to severe complications, such as acute respiratory failure and even death [4-8]. In this report, we describe an unusual case of severe psittacosis related to pet bird exposure.

### Case History

A 36 year old woman was admitted to the emergency room at the Instituto de Infectologia Emilio Ribas (IIER), with acute respiratory distress syndrome. The patient had been well until one week prior to her admission, when she had several episodes of diarrhea and vomiting, followed by a fever (38-38.5°C) and fatigue (day 1 of symptoms). During this time she searched for medical care at another hospital and later being discharged with symptomatic treatment and a presumptive diagnosis of dengue. Four days later, she presented dry cough, dyspnea and chest pain; and a fever (39°C) subsequently. Upon admission to IIER, day 7 after the onset of clinical signs, she reported no vomiting or diarrhea. She was acyanotic, with a temperature of 37.3°C, blood pressure recorded at 131 × 77 mmHg, pulse of 121 beats per minute, and a respiratory rate of 32 breaths per minute. Blood arterial gas saturation was 88% in room air conditions. The liver was enlarged and tender upon abdominal palpation (3.0 cm below the right costal margin). On auscultation, fine crackles were present on lower and middle lung fields. A chest computed tomography scan demonstrated extensive air-space disease interspersed by air-bronchograms in the dependend portions of both inferior lung lobes. Focal areas of consolidation were also observed in the middle and superior lobes (Figure 1). Laboratory tests showed abnormal liver function and C-reactive protein and leukocyte count of 11 × 10<sup>3</sup> cell/mm<sup>3</sup> with left shift (Table 1). Urine and blood culture were negative. Serologic tests for HIV and Histoplasma capsulatum were also

negative.

The patient was married and lived with her family in an urban area. There was no history of recent travels. No significant past medical history regarding infectious diseases, smoking, illicit drug use or exposure to suspected ill individuals was determined. The patient had been vaccinated for H1N1 the previous year. The only comorbidity reported was hypothyroidism, treated with conventional levothyroxine regimen.

The patient purchased a pet cockatiel (*Nymphicus hollandicus*) from a pet store three weeks earlier and reported close contact with the bird. About two weeks after the purchase, the bird started to refuse food and being hypoactive, which was followed by diarrhea. At this point, the bird was taken to a veterinarian but died soon afterwards. Necropsy and laboratorial analysis of the bird's biological samples were not conducted.

After hospital admission, the patient was immediately transferred to an intensive care unit and therapy was initiated with clarithromycin (500 mg twice a day), ceftriaxone (1 g twice a day) and amphotericin B (40 mg once a day); with 50% oxygen administered by face mask. Serum sample was obtained by standard procedures and tested for specific *C. psittaci* IgG antibodies by microimmunofluorescence (MIF). The test was performed with a Chlamydia MIF IgG test (Focus Technologies, USA) according to the manufacturer's instructions. Anti-*C. psittaci* IgG titer was 1:1,024.

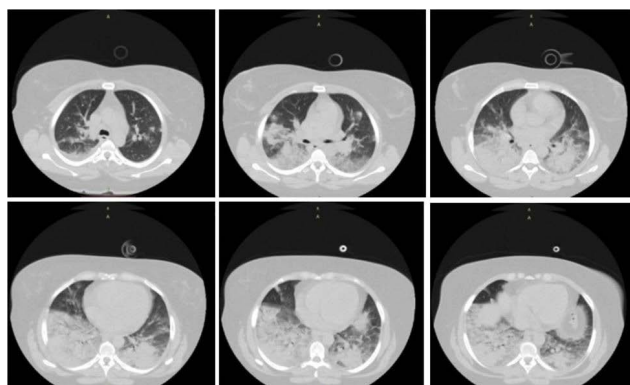
On the subsequent days (days 8-9) her clinical condition worsened, requiring respiratory support with continuous positive airway pressure (CPAP). On the tenth day of hospitalization, the patient began to display a stable respiratory condition. The days following, there was gradual improvement of the patient's clinical condition and laboratory

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**Figure 1:** Computed tomography scan (A-F). Confluent and asymmetric areas of frank air-space consolidation mixed with alveolar and ground-glass infiltrates compromising the lower lobes, interspersed by thin aerobronchograms.

	Day 7	Day 8	Day 14	Day 22
<b>Gasometry</b>				
pH (7.3-7.4)	7.51	7.43	7.4	7.52
pCO <sub>2</sub> (41-51 mmHg)	27	34	32	35
pO <sub>2</sub> (80-105 mmHg)	58	101	70	131
HCO <sub>3</sub> (23-28 mmol/L)	22	22	24.9	29
BE ecf (-2-3 mmol/L)	-1	-2	2	6
FiO <sub>2</sub> (%)	21%	21%	50%	-
Sat. O <sub>2</sub> (95-98%)	92% <sup>†</sup>	98%	95%	99%
<b>Leukogram</b>				
Total leukocytes (4.1-11.2 × 10 <sup>3</sup> /mm <sup>3</sup> )	11	6.7	10.4	8.7
Neutrophils (39.9-73%)	9240 (84%)	4917.8 (73.4%)	8944 (86%)	5324.4 (61.2%)
Lymphocytes (20-45%)	660 (6%)	911.2 (13.6%)	728 (7%)	2401.2 (27.6%)
Monocytes (2-12%)	660 (6%)	435.5 (6.5%)	312 (3%)	765.6 (8.8%)
Basophils (0.3-2%)	0	20.1 (0.3%)	104 (1%)	52.2 (0.6%)
Eosinophils (0.8-6%)	0	80.4 (1.2%)	104 (1%)	156.6 (1.8%)
Band forms	330 (3%)	335 (5%)	208 (2%)	0
Metamyelocytes	110 (1%)	0	0	0
<b>Liver function tests</b>				
ALP (65-300 IU/L)	836	740	487	-
γGT (11-50 IU/L)	317	-	281	147
AST (0-38 IU/L)	101	84	24	17
ALT (0-41 IU/L)	108	93	120	43
C-reactive protein (0-5 mg/L)	295.5	292.7	14.8	-

<sup>†</sup> 88% in air room. **Abbreviations:** pH: potential of hydrogen; pCO<sub>2</sub>: partial pressure of carbon dioxide; pO<sub>2</sub>: Partial Pressure of Oxygen; HCO<sub>3</sub>: Bicarbonate; BE ecf: Base Excess in the Extracellular Fluid Compartment; FiO<sub>2</sub>: Fraction of Inspired Oxygen; Sat. O<sub>2</sub>: Oxygen Saturation; ALP: Alkaline Phosphatase; γGT: Gamma-Glutamyl Transpeptidase; AST: Aspartate Aminotransferase; ALT: Alanine Aminotransferase.

**Table 1:** Laboratory tests performed on patient's admission (day 7) to the day 22 from the initial symptoms of psittacosis.

exams (Table 1), but assisted ventilation was still required, with 50% oxygen on most occasions, until day 22 of hospitalization. Altogether, the patient stayed in the intensive care unit for 10 days and another 14 days in infirmary. Antibiotic therapy was performed with clarithromycin (500mg twice a day) for 24 days and with ceftriaxone for 14 days (1 g twice daily).

The case was reported to public health authorities, which conducted an epidemiological surveillance tracking the source of infection back to the pet shop where the cockatiel was purchased. At the store, dropping samples were taken from nine birds and sent to a private laboratory for molecular analysis. *C. psittaci*'s DNA was detected in 55% (5/9) of the bird samples.

## Discussion

According to the Centers for Disease Control and Prevention (CDC) in USA, from 2005 to 2009, 66 human cases of psittacosis were reported [3]. Nevertheless, these numbers are probably underestimated, since milder cases may not seek for medical attention and physicians are not always able to obtain a solid history of bird contact, which is a valuable clue to the diagnosis, as exposure to birds is reported in 85% of psittacosis cases [9]. Additionally, even when clinical psittacosis is suspected, diagnosis confirmation is still challenging. The most common confirmatory test is a rising titer to *C. psittaci* in paired sera with a microimmunofluorescence test. Most diagnostic difficulties are related to cross-reactivity with other *Chlamydia* spp. infecting humans as well as the frequent combination of empirical therapy for community-acquired pneumonia, which may blunt the antibody response to *C. psittaci* [3,10].

Therefore, impact of *C. psittaci* infections on human health is difficult to evaluate. Before antimicrobial agents were available, 15% to 20% of humans with *C. psittaci* infection died. Despite the fact that mortality has been decreasing since the advent of antibiotics [3], prompt diagnosis and treatment of suspected cases is paramount in preventing fatal outcomes.

In the present report, the patient presented a severe respiratory failure with chest computed tomography scan findings nonspecific for lung air-space disease and extrapulmonary findings related to the liver dysfunction. These features are related to most severe forms of psittacosis [4-8,11], although have also been observed in other atypical pneumonias [2]. Since no other specific features were found at clinical presentation, a useful way to broaden the diagnosis scope is to review environmental exposure; which in this case, disclosed contact with a sick cockatiel. Consequently, suspicion of psittacosis was raised and patient's serum sample evaluated by means of MIF revelling IgG anti-*C. psittaci* titre of 1,024.

Even with a single serum sample evaluation, the early diagnosis of psittacosis was essential for immediate epidemiologic investigations. Public health authorities reached the pet shop where the patient's bird had been purchased and took appropriated measures to avoid further cases. In addition, corroborates to our patients diagnosis confirmation since epidemiologic link to the source of infection was established and convincing evidence was obtained through the molecular detection of *C. psittaci* from the infected birds.

Psittacosis presenting as severe respiratory insufficiency is not usual, still diagnostic delay can be an important factor with respect to outcome [4,9,10]. Campaigns to raise awareness among professional health care workers and the general public to increase the degree of attentiveness to human psittacosis are needed.

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## Compliance with Ethics Guidelines

All procedures followed were in accordance with the ethical standards of

the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 and 2008. Informed consent was obtained from all patients for being included in the study. All institutional and national guidelines for the care of animals were followed.

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