Case Report

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Fulminant psittacosis in a traveller

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Introduction: Psittacosis is a rare cause of pneumonia, caused by *Chlamydia psittaci*. The disease is transmitted to humans via inhalation of dried bird faeces, feather dust, urine or respiratory secretions. The disease can range from a mild form with non-specific symptoms to severe systemic disease with prominent respiratory symptoms. Psittacosis causing severe respiratory failure requiring mechanical ventilation is uncommon.

Case presentation: A 64-year-old male tourist from Hong Kong presented to the emergency department with a 5 day history of headache, myalgia and fever. He had a productive cough and was short of breath. The patient developed septic shock with multiorgan failure requiring intensive care support. We received information from the Centre for Health Diseases in Hong Kong about a psittacosis outbreak in an animal management centre where our patient had been working with recent occupational exposure to dead parrots. Despite a significant increased mortality rate associated with respiratory and renal involvement in psittacosis, our patient survived the sepsis and multiorgan failure and was repatriated back for further rehabilitation.

Conclusion: The case illustrates the importance of exploring a patient's occupational history to establish an infection exposure. The respiratory symptoms, myalgia and fever warranted consideration of an atypical pneumonia. The patient had bilateral pulmonary infiltrates contrary to the unilateral involvement in the majority of the patients with chest X-ray abnormalities. Despite a high mortality rate associated with respiratory and renal involvement, our patient survived the severe sepsis.

Keywords: intensive care; pneumonia; psittacosis.

Received 3 December 2014
Accepted 16 December 2014

Introduction

Psittacosis is a rare cause of pneumonia throughout the world, caused by *Chlamydia psittaci*. The disease is transmitted to humans via inhalation of dried bird faeces, feather dust, urine or respiratory secretions (Department of Health and Ageing, 2013). The disease can range from a mild form with non-specific symptoms to severe systemic disease with prominent respiratory symptoms. Psittacosis causing severe respiratory failure requiring mechanical ventilation is uncommon and fatal cases are rare. Although the overall mortality from psittacosis is only 0.7 %, it rises drastically to 70 % when respiratory and renal failure sets in (Yung & Grayson, 1988). Since most cases present as influenza-like symptoms, the disease can be easily overlooked, and thus diagnostic delay and mistreatment can lead to severe complications and even death (Mandell *et al.*, 2010; Williams *et al.*, 1998). We report an unusual case of fulminant psittacosis with multiorgan failure in a tourist

from Hong Kong with a history of occupational exposure to psittacosis.

Case report

A 64-year-old male tourist from Hong Kong presented to the emergency department of a tertiary hospital with a 5 day history of headache, myalgia and fever. He had a productive cough and was short of breath. Initial history from family members revealed that there was no recent history of travel elsewhere and there was no exposure to pets or animals at home.

He was started on ceftriaxone and azithromycin but was intubated soon after admission for worsening respiratory failure and transferred to the intensive care unit for further management. He had bilateral infiltrates on a chest X-ray (Fig. 1) and required lung-protective ventilation with high oxygen and vasopressor requirements.

He developed a mild acute kidney injury and his liver enzymes remained elevated. Given his worsening shock state and ongoing fever, his antibiotics were escalated to

Abbreviations: Abbreviations: CHDHK, Centre for Health Diseases in Hong Kong; EIA, enzyme immunoassay; MIF, microimmunofluorescence; RT-PCR, real-time PCR.

Fig. 1. Chest X-ray of the patient demonstrating bilateral infiltrates.

piperacillin-tazobactam and vancomycin. Oseltamivir was also added empirically. His shock state improved in the first 48–72 h and he gradually improved over the next few days.

Two weeks after admission, with the assistance of an interpreter, further occupational information revealed that the patient was employed as a quarantine officer in Hong Kong. The family were contacted by the Centre for Health Diseases in Hong Kong (CHDHK) to say they were investigating an outbreak of psittacosis in the animal handling centre where the patient was employed. Colleagues of the patient had been diagnosed with psittacosis thought to have been associated with handling ill and dead parrots. The patient had been handling these birds with his colleagues 7 days prior to leaving Hong Kong on his vacation.

Investigations

On admission, he had elevated liver enzymes, mild neutrophilia with toxic changes and elevated C-reactive protein of 355 mg l⁻¹. Urinary *Legionella* and *Streptococcus pneumoniae* antigen tests were negative. Serology for *Mycoplasma*, *Legionella* and influenza was negative, and the sample was stored for *Chlamydia* testing pending a repeat convalescent sample as per normal protocol. Molecular testing for *Mycoplasma pneumoniae*, *Bordetella pertussis* and respiratory viruses was negative. His blood, urine and sputum cultures remained negative. The testing for *Chlamydia* was done 2 weeks into the admission on the admission (acute) specimen and a current (convalescent) specimen. The acute specimen revealed a *Chlamydia* group IgG antigen enzyme immunoassay (EIA) ratio of 6400, whilst the convalescent sample showed a *Chlamydia* group IgG EIA of 51 200. This was performed at the central laboratory in Brisbane using a commercial assay from Medac.

The positive result was sent to the Virology and Infectious Disease Reference Laboratory in Melbourne for commercial microimmunofluorescence (MIF) testing. The acute specimen revealed a *C. psittaci* IgG MIF titre of 2048 and the convalescent specimen showed a twofold rise. Serum samples were forwarded to CHDHK for molecular typing for comparison with samples from his colleagues for further investigation of the outbreak. Respiratory secretion real-time (RT)-PCR for *C. psittaci* confirmed the diagnosis of psittacosis in our patient. Respiratory swabs from three other patients as well as the swabs from the parrot cages tested positive for *C. psittaci* on RT-PCR in accordance with the information from CHDHK. Paired sera taken from acute and convalescent stages showed more than a fourfold rise in antibody titres against *Chlamydia* in the other two patients. There was no reported mortality.

Diagnosis

The patient was diagnosed to have psittacosis based on RT-PCR for *C. psittaci*.

Treatment

Doxycycline therapy was started and other antibiotics were ceased, and serological testing for *Chlamydia* was undertaken. The patient's multiorgan failure was supported appropriately as outlined above.

Outcome and follow-up

He was tracheotomized 9 days after admission for further ventilatory wean and was finally weaned off the ventilator after a further period of 11 days in the intensive care unit. The patient was then repatriated back to Hong Kong for further rehabilitation.

Discussion

Psittacosis is a zoonotic disease caused by *C. psittaci*. The overall mortality rate from psittacosis is 0.7 % (Yung & Grayson, 1988). In severe cases, the disease can proceed to involve the cardiac, renal, haematological, gastrointestinal and central nervous systems. The symptoms arise after an incubation period of 5–15 days (Yung & Grayson, 1988). The most common clinical features of psittacosis are high fever, headache and dry cough. Chest X-ray abnormalities may be seen in 75 % of patients (Mandell *et al.*, 2010). The most frequent discovery is consolidation in a single lower lobe. Other laboratory findings include a deranged liver function test and elevation of erythrocyte sedimentation rate and C-reactive protein levels. Leucocyte count is commonly not elevated or is moderately elevated. Left shift and toxic granulation of neutrophils may be observed without neutrophilia. Fulminant psittacosis can manifest in multiorgan failure. Respiratory failure and acute renal

failure may require mechanical ventilation and dialysis, respectively, and increase the mortality rate 100-fold (Byrom *et al.*, 1979; Pandeli & Ernest, 2006; Petrovay & Balla, 2008). Other complications including pancreatitis, myocarditis, splenic infarction, encephalopathy, massive pulmonary embolism and septic shock have also been reported (Byrom *et al.*, 1979; Pandeli & Ernest, 2006). Serology remains the most widely available method for laboratory diagnosis of *C. psittaci* infection, with complement fixation, MIF and EIA the most commonly used techniques.

The Centres for Disease Control and the Council of State and Territorial Epidemiologists define a confirmed case of psittacosis when the illness is clinically compatible with psittacosis and the case is confirmed by the laboratory either by isolation of *C. psittaci* in respiratory specimens or blood, or by a fourfold or greater increase in antibodies (IgG) against *C. psittaci* between paired acute and convalescent phase serum specimens obtained at least 2–4 weeks apart (National Association of State and Public Health Veterinarians, 2010).

MIF is the generally accepted test for *C. psittaci* due to less cross-reactivity with other species, as it tests for a *C. psittaci*-specific surface antigen. Complement fixation and EIA test a LPS that is common to *C. psittaci* and *Chlamydia pneumoniae* and hence fail to distinguish between them, although therapy is the same and the main indication for distinguishing between them is for epidemiological purposes. EIA can be used as an initial screening test.

Doxycycline is the treatment of choice and defervescence can be expected after 48 h of treatment with tetracyclines (Yung & Grayson, 1988). Oral doxycycline, 100 mg twice daily for 14 days, or oral tetracycline chloride, 500 mg four times daily for 10–21 days, is recommended (Yung & Grayson, 1988; Mandell *et al.*, 2010). Clarithromycin or roxithromycin is used as a second-line drug.

We have presented an infrequent occurrence of fulminant psittacosis. Our patient clearly had exposure to birds through his occupation; however, this information could not be established early on. This case illustrates the importance of exploring a patient's occupational history to establish an infection exposure. The CHPHK later revealed that there was an outbreak of psittacosis in a batch of seized parrots, of

which a few died and the rest were euthanized. The respiratory symptoms, myalgia and fever warranted consideration of an atypical pneumonia such as viral pneumonia, Q fever, legionellosis, *Mycoplasma* infection and *C. pneumoniae*. The patient developed septic shock with multiorgan failure with clinical evidence of renal, circulatory, hepatic and respiratory involvement. The patient had bilateral pulmonary infiltrates on a chest X-ray contrary to the unilateral involvement in the majority of patients. Despite high mortality rates associated with multiorgan failure, our patient survived the severe sepsis and was repatriated back to Hong Kong.

Acknowledgements

The authors would like to thank Dr Petra Derrington for her kind support and advice.

The authors declare they have no conflicts of interest.

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