CASE REPORT

Birds of a feather: an uncommon cause of pneumonia and meningoencephalitis

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SUMMARY

A 61-year-old man was admitted with a 1-week history of influenza-like symptoms during a period of increased influenza virus activity. He soon developed type 2 respiratory failure and became increasingly drowsy. He later suffered a convulsive episode in the intensive care unit (ICU) which self-terminated. Initial clinical findings suggested community-acquired pneumonia and meningoencephalitis. However, a detailed history revealed that he was a pet bird-keeper, which raised a suspicion of ornithosis. *Chlamydia psittaci* DNA was detected in sputum by PCR. He was started on appropriate antibiotics and made a full recovery. We present this uncommon cause of pneumonia as an example of the importance of accurate history-taking to ensure a correct diagnosis for optimal management.

BACKGROUND

Psittacosis presents with influenza-like symptoms, being easily dismissed as a simple community-acquired pneumonia (CAP) or influenza.¹ Our case demonstrates the importance of considering other potential causes of atypical pneumonia during the peak season for influenza, by obtaining a detailed clinical history.

CASE PRESENTATION

A 61-year-old man was admitted feeling generally unwell. It was peak influenza season and he was admitted with a 1-week history of influenza-like symptoms, developing a fever, productive cough, malaise and breathlessness on minimal exertion. He also had recent episodes of forgetfulness in which he would repeat himself or stop midway through sentences. He had no history of recent travel or diarrhoea. He had already completed a course of amoxicillin, following which he developed a maculopapular rash. He had no other significant medical history.

On admission, he was haemodynamically stable with a GCS of 15. He was tachypnoeic with reduced saturations of 88% on air. He had decreased air-entry in the right base of the lung on auscultation and chest X-rays showed a right middle lobe and left lower lobe consolidation (figure 1). CT scanning also indicated a bilateral pneumonia with small pleural effusions. Blood results showed a mild hyponatremia and raised inflammatory markers. He also had an acute kidney injury and was in type II respiratory failure. Other routine investigations were unremarkable.

Shortly after admission, he developed a fever of 39.1°C and became increasingly drowsy, irritable and confused with his GCS deteriorating to 11.

Oxygen requirements continued to rise, saturating at 97% on 60% high flow oxygen. He had frequent episodes of confusion on the first 2 days and suffered a convulsion on the third day with a full tonic-clonic seizure, self-terminating within 2 min.

During his stay in ICU, it became known that he was a hobbyist bird-keeper. He kept several species of birds, including cockatiel, parrotlet, kakareki, turquise, budgie, canary, bengalese finch, diamond doves, lovebirds, chickens and red rump parrots. Two of these birds had unexpectedly died very recently since the patient's admission. This raised a suspicion of an infection with *Chlamydia psittaci*.

INVESTIGATIONS

Our patient had undergone a number of investigations, including a lumbar puncture, blood and sputum culture with PCR testing and close monitoring of biochemical markers for inflammation and acute kidney injury (table 1).

Throat swab and sputum: influenza A and B virus RNA not detected by PCR.

Blood cultures: no growth.

Sputum culture: no respiratory pathogens isolated.

Sputum: *C. psittaci* DNA detected by PCR.

Serology: Positive for antibody to *C. psittaci* at a titre of 1/128.

Microscopy of CSF: moderate ($118 \times 10^6/\text{mL}$) lymphocytosis of 83%, RBC $90 \times 10^6/\text{mL}$, no organism seen on Gram staining. Biochemistry of CSF: protein raised at 0.93 g/L, glucose 4.3 mmol/L.

PCR tests on CSF: negative for HSV, VZV and enterovirus.

Figure 1 A plain film chest X-ray indicating a right middle and left lower lobe consolidation.

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Table 1 Results from biochemistry analysis of blood samples taken over the initial 3–4 days of admission

	Admission	Day 1	Day 2	Day 3
WCC ($\times 10^9/L$)	11.03	11.61	8.87	11.32
Lymphocytes ($\times 10^9/L$)	0.65	1.25	1.15	1.06
CRP (mg/L)	133	51	29	15
Sodium (mmol/L)	129	135	141	142
Creatinine ($\mu\text{mol/L}$)	136	96	67	73
Urea (mmol/L)	7.0	6.0	7.1	7.8

DIFFERENTIAL DIAGNOSIS

Influenza virus infection and meningoencephalitis.

Pneumonia secondary to typical or atypical organisms such as legionella and mycoplasma and meningoencephalitis.

Extrinsic allergic alveolitis (bird fancier's lung).

TREATMENT

He was managed in ICU with high flow oxygen and intermittent non-invasive ventilation (NIV). He was initially started on broad-spectrum antibiotics, eropenem and clarithromycin (given the potential penicillin allergy) and oseltamivir. Once influenzae virus infection was excluded and the diagnosis of psittacosis was more likely, he was treated with ceftriaxone, acyclovir and doxycycline. Following this, he improved markedly within 24 hours, with his oxygen requirement declining and inflammatory markers improving. Once *C. psittaci* was detected in the sputum sample, doxycycline was continued as the sole antimicrobial agent for 3 weeks. The patient recovered well, suffering no further convulsions. His hypoxia and respiratory failure improved. He later developed a swollen and painful right knee, believed to be secondary reactive arthritis, commonly seen in two-thirds of all patients diagnosed with psittacosis.

OUTCOME AND FOLLOW-UP

This infection was reported to Public Health England as the patient's birds posed a continuing risk to others. The patient made a complete recovery with treatment and was discharged.

DISCUSSION

Psittacosis, also known as parrot fever and ornithosis, is a cause of pneumonia in humans who are exposed to birds infected with this organism. It was first described in 1879 and is caused by an infection with *C. psittaci*, which is an obligate intracellular organism.^{2–3} It is a known risk for pet bird owners, zoo and pet shop workers/visitors, poultry farmers as well as veterinarians. Transmission is through the inhalation of aerosolised bacteria from the faeces, feather dust or respiratory secretions of infected birds. Human to human transmission is rare, but possible. Approximately 50 cases are confirmed in England and Wales each year but is believed to be underdiagnosed.¹ Sporadic cases and outbreaks of infection can occur. The incubation period can last from 1 to 4 weeks and most infections are symptomatic within 2 weeks.

In birds, *C. psittaci* can present with lack of appetite, weight loss, difficulty in breathing, watery green droppings, pink eyes, discharge from eyes or nares or sudden death. To prevent further human infections, any case of *C. psittaci* should be alerted to Public Health who will liaise with other Agencies to control the infection in these birds.⁴

Ornithosis is a systemic infection but patients classically present as a CAP and up to 70% have influenza-like symptoms, including fever, headaches and malaise.¹ A productive cough is present in over 50% but may be delayed. Psittacosis is more likely in the presence of relative bradycardia, rash, haemoptysis, epistaxis and splenomegaly. Symptoms can range from mild coryzal symptoms to severe respiratory failure and meningoencephalitis. Neurological symptoms are common and include severe headache, photophobia and a reduced GCS. Dermatological manifestations include a facial macular rash (Horder's spots) that mimics the appearance of the rose spots of typhoid fever.⁵ Our patient had developed a maculopapular rash that was initially considered to be an allergic reaction to amoxicillin. Other end-organ complications such as endocarditis, renal disease, myocarditis, hepatitis, kerato-conjunctivitis, arthritis and encephalitis have also been described.³ Our patient presented with normal GCS but progressively became irritable, confused and later developed seizures. Though we did not isolate any *C. psittaci* in CSF, findings in CSF were not suggestive of viral infection. Isolation of *C. psittaci* in CSF is rare.^{6,7}

On the basis of clinical presentation, which responded to doxycycline and isolation of *C. psittaci* in sputum, we concluded that the meningoencephalitis was secondary to psittacosis.

Laboratory diagnosis is usually by serological methods, though rapid molecular tests are available in some centres. Culture of this hazardous organism is not attempted in diagnostic laboratories.

Reporting of psittacosis is uncommon in literature. An observational study in Holland of 147 patients admitted with CAP found 4.8% had laboratory evidence of psittacosis. They concluded that psittacosis should be considered more readily, especially in patients who are not recovering as anticipated.⁸

A case in the literature has been documented in which a patient booked for an elective thyroidectomy developed pneumonia and tracheobronchomalacia postoperatively. The primary problem was multiple failed extubations. An emergency bronchoscopy revealed a collapse of more than 50% of the lumen of the lower trachea and large bronchi, diagnostic of tracheobronchomalacia. The patient was not responsive to penicillin and macrolide therapy, given for her pneumonia. Further investigations, however, in the form of complement fixation, found a significant increase in the chlamydia antibody titres and subsequent microimmunofluorescent antibody assay revealed *C. psittaci*. The patient ultimately recovered on high-dose macrolide therapy.⁹

Following a large outbreak of community-acquired psittacosis in 2002 in residents of the Blue Mountains, New South Wales, Australia, a review of new cases in this area over a 7-year period from 2003 to 2009 was undertaken.¹⁰ Forty-eight patients met the diagnosis of psittacosis. Sixty per cent patients had no direct contact with birds. Lawn-mowing without the use of grass catcher was suggested as one of the risk factors. Of the 48 patients, 23 included in the study had a positive specimen for *C. psittaci* with only one positive CSF result. It is also detailed here that, prior to this case series, Walder *et al*⁶ describe only one positive CSF result that has been documented in the literature prior to 2003, which occurred in a patient with status epilepticus.

Most authorities recommend tetracycline as the antibiotic of choice to treat ornithosis. Macrolide and quinolone antibiotics have also been used to treat this infection.⁷ It is essential, as in our case of severe infection that the most effective antibiotic is administered on clinical suspicion without waiting for

laboratory confirmation. The consideration of a bird-related source of infection was only suspected on taking a good social history and thus doxycycline was started to cover for this rare, potential case scenario. Delay in treatment could have resulted in a poor outcome for the patient.

Learning points

- ▶ In patients presenting with community-acquired pneumonia who have been exposed to birds, psittacosis should be borne in mind.
- ▶ Doxycycline is the drug of choice for adults and should be initiated as soon as psittacosis is suspected.
- ▶ Public health should be notified as soon as *Chlamydia psittaci* infection is strongly suspected or has been confirmed.

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Competing interests None declared.

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