Psittacosis domiciliary outbreak associated with monk parakeets (Myiopsitta monachus) in Brazil: need for surveillance and control

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Introduction: Psittacosis is a bacterial infection of humans caused by Chlamydia psittaci and can lead to severe pneumonia that is potentially fatal if not treated. Many psittacosis cases occur after exposure to infected birds, frequently parakeets, cockatiels, parrots and macaws. Despite the fact that psittacosis is the most important zoonosis transmitted by pet birds, the disease is probably underdiagnosed due to diagnosis difficulties and lack of notification.

Case presentation: Here, we described a psittacosis domiciliary outbreak related to monk parakeets (Myiopsitta monachus) acquired from illegal trade, resulting in seven people with severe atypical pneumonia and six hospitalizations.

Conclusion: Campaigns to raise awareness could increase the general degree of attentiveness to human psittacosis. Furthermore, focusing efforts on markets to regulate, or in some cases eliminate, the trade in wildlife could provide a cost-effective approach to decrease the risks of disease for humans.

Keywords: Chlamydia psittaci; psittacosis; wild birds; zoonosis.

Introduction
Psittacosis is a zoonotic diseases caused by Chlamydia psittaci, mostly after exposure to infected birds. Infection usually occurs when a person inhales the aerosolized organism from dried faeces or respiratory secretions, which can occur through mouth-to-beak contact or handling of infected birds. Zoonotic transfer may result in subclinical infection or manifest as a ‘flu-like’ illness or a potentially fatal interstitial pneumonia; the onset of the illness usually follows an incubation period of 5–14 days. The disease is rarely fatal in properly treated patients, and for that reason early diagnosis is important (Beeckman & Vanrompay, 2009; NASPHV, 2010).

In humans, psittacosis is usually diagnosed using a combination of clinical signs and serology. The most common confirmatory test is a rising titre to C. psittaci in paired sera with a microimmunofluorescence test (NASPHV, 2010). For epidemiological surveillance, the Centers for Diseases Control and Prevention (CDC) have established case definitions (CDC, 1997). Nonetheless, psittacosis-confirmed cases can be difficult to determine. Some causes include cross-reactivity with other Chlamydia spp. infecting humans and empirical therapy for community-acquired pneumonia, which may blunt the antibody response to C. psittaci. Therefore, a history of bird contact is a valuable clue to be obtained during the disease investigation, as exposure to birds is reported in 85 % of psittacosis cases (Yung & Grayson, 1988; Beeckman & Vanrompay, 2009).

In birds, the disease resulting from C. psittaci infection is called chlamydiosis. The order Psittaciformes (e.g. parrots, parakeets, macaws) contains the greatest number of Chlamydia-positive species (Kaleta & Taday, 2003). In Brazil, C. psittaci in Psittaciformes has been detected in breeding facilities, pet markets, illegally traded birds and wildlife (Raso et al., 2002, 2006, 2013a; Santos et al., 2014). It is noteworthy that some of these C. psittaci-positive psittacine birds have been related to severe forms of human psittacosis (Hochhegger et al., 2009; Raso et al., 2013b, c). One of the issues involving psittacosis and public health concern is the increasing popularity of birds as pets. Therefore, the aim of this study was to report a psittacosis domiciliary outbreak resulting from contact with illegal monk parakeets (Myiopsitta monachus) acquired as pets.

Abbreviations: CDC, Centers for Diseases Control and Prevention; MIF, microimmunofluorescence
Table 1. Clinical features; serology diagnosis and case definition’s outcome of patients involved in a psittacosis domiciliary outbreak in Rio Grande do Sul, Brazil

<table>
<thead>
<tr>
<th>Patient</th>
<th>Gender</th>
<th>Age (years)</th>
<th>Clinical features</th>
<th>Radiological findings</th>
<th>Hospitalization (days)</th>
<th>Antibody titres (MIF test)</th>
<th>Definition of case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>First sample</td>
<td>Second sample*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IgG</td>
<td>IgM</td>
</tr>
<tr>
<td>1</td>
<td>F</td>
<td>27</td>
<td>Malaise, photophobia, nausea, vomiting</td>
<td>Pneumonia</td>
<td>11</td>
<td>1 : 128</td>
<td>&lt;1 : 10</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>63</td>
<td>Fever, malaise, photophobia, chills chest tightness, cough</td>
<td>Pneumonia</td>
<td>5</td>
<td>&lt;1 : 16</td>
<td>&lt;1 : 10</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>51</td>
<td>Fever, malaise, photophobia, chills chest tightness, cough</td>
<td>Pneumonia</td>
<td>6</td>
<td>&lt;1 : 16</td>
<td>&lt;1 : 10</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>58</td>
<td>Fever, malaise, chills, myalgia, chest tightness, headache, cough</td>
<td>Pneumonia</td>
<td>9</td>
<td>1 : 32</td>
<td>&lt;1 : 10</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>56</td>
<td>Fever, malaise, chills, breathing difficulty, cough</td>
<td>Pneumonia</td>
<td>5</td>
<td>1 : 16</td>
<td>&lt;1 : 10</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>17</td>
<td>Fever, chills, myalgia, headache</td>
<td>Pneumonia</td>
<td>no</td>
<td>&lt;1 : 16</td>
<td>&lt;1 : 10</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>10</td>
<td>None</td>
<td>Pneumonia</td>
<td>no</td>
<td>&lt;1 : 16</td>
<td>&lt;1 : 10</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>55</td>
<td>Fever, malaise, myalgia, chills, headache, breathing difficulty, cough</td>
<td>Pneumonia</td>
<td>8</td>
<td>1 : 16</td>
<td>&lt;1 : 10</td>
</tr>
</tbody>
</table>

M, male; F, female.

*12 days between blood sample collection.
Case report

In the city of Dom Pedrito, Rio Grande do Sul State, a respiratory disease involving eight members of the same family was reported to public health authorities. The main signs and symptoms included fever (six of the eight family members), chills (six members), malaise (six members), cough (five members), headache (three members), myalgia (three members), chest tightness (three members) and breathing difficulty (two members), at times requiring hospitalization. During investigation, it was disclosed that the onset of the illness started after direct contact with monk parakeets that died a few days after being purchased from illegal trade. Thus, psittacosis was suspected. For laboratorial diagnosis, a single serum sample from one individual and two serum samples with a 12-day interval from seven individuals were obtained by standard procedures and tested for specific C. psittaci IgM and IgG antibodies by microimmunofluorescence (MIF). The test was performed with a Chlamydia MIF IgG and Chlamydia MIF IgM test (Focus Technologies) according to the manufacturer’s instructions. A confirmed psittacosis case was classified according to the CDC Case Definitions for Infectious Conditions under Public Health Surveillance (CDC, 1997) (Table 1). A patient was considered to have a confirmed case of psittacosis when the clinical illness was compatible with psittacosis and laboratory results confirmed by MIF for IgG or IgM. A probable case was considered when the patient presented a clinically compatible illness, was epidemiologically linked to a confirmed case and had low titres of IgG. Finally, a suspected case was defined as a patient with respiratory symptoms epidemiologically linked to a confirmed case but without supportive serology.

Discussion

In Brazil, the incidence or prevalence of psittacosis is still unknown. Several factors may contribute to the current lack of data on this zoonosis. General practitioners might not necessarily be aware of the zoonotic nature of avian chlamydiosis. Furthermore, even when contact with birds is brought to light in the patient’s history and psittacosis is suspected, laboratory-confirmed cases can be difficult to determine (Beeckman & Vanrompay, 2009).

In the present outbreak, a sick individual revealed an increased IgM anti-C. psittaci titre and three sick individuals presented an increase in IgG anti-C. psittaci titres, which agreed with the CDC guidelines for confirmed cases. Nonetheless, another three people without laboratorial confirmation but with a history of bird direct contact developed pneumonia demanding hospitalization. Serological false-negative results may occur when patients are sampled before seroconversion and also when treatment antibiotic therapy is initiated before testing, as it may inhibit the development of anti-C. psittaci antibodies as reported previously (Verminnen et al., 2008; Fraeyman et al., 2010).

In the current study, it was assumed that these two probable and one suspected cases might have developed psittacosis, due to the clinical signs presented associated with an epidemiological link to psittacosis-confirmed cases, as well as to monk parakeets. Unfortunately, in the present study, the monk parakeets died and were discarded without veterinary evaluations, precluding laboratory diagnosis. Nonetheless, the potential role of monk parakeets in transmitting C. psittaci to humans already has been documented. Smuggled monk parakeets were attributed as a source of infection in other psittacosis outbreak reported in Brazil (Raso et al., 2013c).

Campaigns to raise awareness, organized by national or local governments, could increase the general degree of attentiveness to human psittacosis (Beeckman & Vanrompay, 2009). Furthermore, focusing efforts on markets to regulate, or in some cases eliminate, the trade in wildlife could provide a cost-effective approach to decrease the risks of disease for humans. Education of pet bird owners about appropriate management of their birds is also of paramount importance. These measures include practising preventative husbandry as well as maintaining a clean environment, adequate hygiene, preventing mouth-to-beak contact with pets and purchasing birds from legal sources.

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References


