

Psittacosis outbreak in Tayside, Scotland, December 2011 to February 2012

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A Tayside outbreak of psittacosis December 2011–February 2012 involved three confirmed and one probable cases. Confirmed cases were indistinguishable by sequencing of polymerase chain reaction (PCR) products. The epidemiological pattern suggested person-to-person spread as illness onset dates were consistent with the incubation period and no single common exposure could explain the infections. In particular the only common exposure for a health-care worker case is overlap in place and time with the symptomatic index case.

Outbreak description

During February 2012, Tayside's Health Protection Team was notified of five cases of pneumonia. These illnesses affected four family members and one health-care worker (HCW) who had tended the index case. Four of these developed severe symptoms, two requiring intensive care unit (ICU) admission. These four had complement fixation tests (CFT) suggesting infection with a *Chlamydophila* species. Although speciation was not possible at this stage, the time interval of one to 22 days between the symptom onset of consecutive cases, suggested person-to-person spread. An outbreak of *Chlamydophila pneumoniae* infection therefore seemed likely. Pending identification, the outbreak response proceeded on this basis. By mid-February *C. psittaci* was confirmed by polymerase chain reaction (PCR).

Background

Psittacosis is a systemic infectious disease caused by *Chlamydophila psittaci*. Usual features include fever, malaise, unproductive cough, headache and atypical pneumonia. The incubation period is one to four weeks [1]. Since its first description in 1879 [2], epidemics occurred during the next century. Where identified, the source of such outbreaks and infections was zoonotic, and predominantly avian but not necessarily psittacine. For example, large outbreaks occurred among poultry workers [3]. Subsequently, these have become rare, as avicultural hygiene has intensified. In Scotland, up to 10 sporadic cases per year were notified (no outbreaks) in the past 10 years (Table) [4]. We have found no case described in the literature where person-to-person spread has accounted for cases of psittacosis, although person-to-person transmission has evidently been suggested but not proven [5].

Outbreak investigation and results

During a series of outbreak management team (OMT) meetings, results were assessed and further investigation directed. Awareness raising among Tayside medical practitioners aimed to increase case ascertainment. The investigation progressed on three fronts: epidemiological, microbiological and environmental.

TABLE

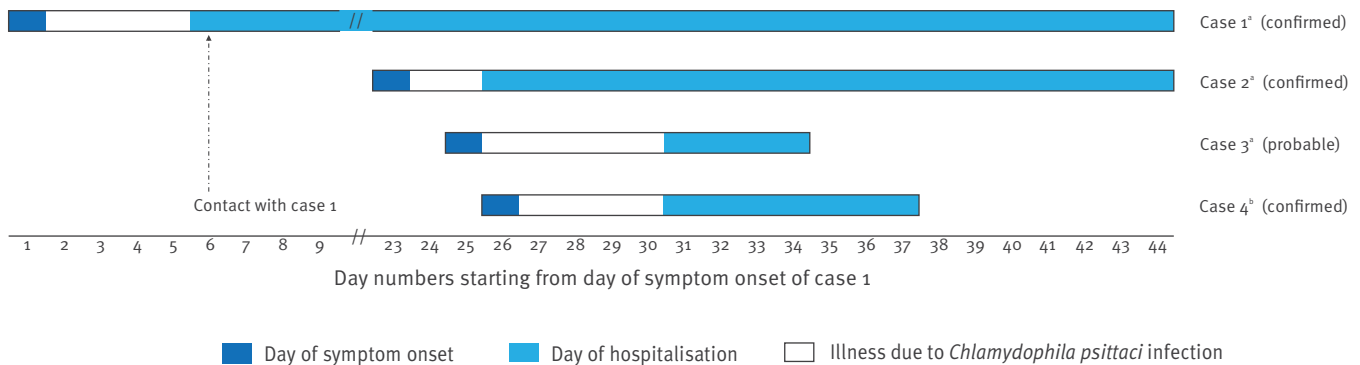
Total number of cases of *Chlamydophila psittaci* infections notified annually, Scotland, 2001–2011 (n=27)

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of cases	2	10	1	4	0	0	1	1	2	5	1

Source: Health Protection Scotland (HPS) (Lynda Browning, personal communication, 23 May 2012) [4].

FIGURE

Time of symptom onset and clinical course of probable and confirmed cases, psittacosis outbreak in Tayside, Scotland, December 2011–February 2012 (n=4)



^a Cases 1, 2 and 3 were part of an extended family and had extensive and frequent contact with each other.

^b Case 4, a healthcare worker, had contact with case 1 on the sixth day of case 1's illness, as indicated by an arrow.

Epidemiological investigation

A modified Centers for Disease Control and Prevention (CDC) case definition [6] was agreed. To be considered, cases must have compatible clinical illness. All notified cases were interviewed about their illness, contacts and relevant possible exposures. Confirmed cases had either *Chlamydophila* species detected in respiratory secretions (by culture or PCR) or a fourfold or greater increase in antibody (IgG or IgM) to *Chlamydophila* species (to a reciprocal titre of 32 between paired acute- and convalescent-phase serum specimens taken at least two weeks apart) by CFT. Cases which were epidemiologically linked to a confirmed case were considered probable, given an antibody (IgG or IgM) titre of 256 or greater, and possible given one of 32 to 128 (all by CFT in a serum specimen taken after symptom onset).

Applying this, by 22 February 2012, the outbreak involved three confirmed, one probable and two possible cases, with the index case having had onset of illness in late December 2011. The figure describes the time of onset and clinical course for confirmed and probable cases. These comprised three female and one male with an age range of 41 to 65 years.

A further two possible cases were identified: a family member with mild respiratory illness and an unrelated patient from the same ICU as the index case.

Microbiological investigation

Initial investigations used CFT performed according to standard methods using antigen obtained from Launch Diagnostics, Longfield, Kent, United Kingdom (UK) [7]. The CFT antigen is a chlamydia group specific antigen. The test detects total complement fixing antibody: both IgG and IgM.

Real-time PCR was performed using in house assay on respiratory samples which were initially used for investigations for respiratory viruses. The screen for *Chlamydophila* species was an assay targeted to 16S ribosomal sequences. Any positive sample was further investigated by specific real-time PCR to *C. psittaci* or *C. pneumoniae* targeting a different region of the 16S ribosomal sequence. This enabled determination of which *Chlamydophila* species was involved in a case.

Of the confirmed cases, two showed a rising CFT titre, one a static raised titre. All were PCR positive. Sequence analysis of the outer membrane protein A (ompA) gene showed 100% similarity between these *C. psittaci* strains. The probable case had a static CFT titre above 256 and was PCR negative. Possible cases had static titres of 64 to 128 and were PCR negative.

Environmental investigation

Extensive cartographical and field searches were made for possible avian sources of infection. These were directed by information gleaned from interviews with cases. Workplaces and residences of cases were plotted on an Ordnance Survey map. Cases 2 and 3 lived together a kilometre from case 1. Case 4 resided a further ten kilometres west. Although not within any of the cases' respective place of residence, two pigeon coops and a cage of small birds were found in the neighbourhood of where cases 1, 2 and 3 lived. None were within 500 m of case 1, but as these could be considered a plausible source, faecal samples were taken for PCR analysis.

The index case's pet dog was reported to have rolled in the remains of a dead bird in December. Also, this

case's workplace was reported to be affected by a large number of gulls. Searches in both areas revealed insufficient sample material. On veterinary recommendation (included in the OMT), a PCR analysis of a pooled canine faecal sample was done, using an unpublished method, developed at the UK Animal Health and Veterinary Laboratories Agency, Weybridge. This PCR detects the presence of *C. psittaci* and *C. abortus* and was negative.

No environmental source of any *Chlamydomphila* species was revealed by environmental investigations. This is not unusual [8].

Control measures

Since the source of the infection was thought to be a pathogen which was not readily transmissible from person-to-person, standard infection control measures were recommended for those HCWs and other people in contact with cases.

Discussion and conclusion

The main issue in this outbreak is the picture of person-to-person spread. The authors can find no description of this in psittacosis. Incubation ranging from one to four weeks implies up to 21 days between shortest and longest. The longest gap between onset of confirmed cases was 25 days. While the cases amongst the extended family might be explained by a putative persistent source to which family members were sequentially exposed (e.g. a geographical, not temporal, point source), case 4 (the HCW) cannot.

Since cases 1 to 3 were members of an extended family and had extensive and frequent contact with each other (especially over the winter holiday season) it was not possible to retrospectively identify particularly significant 'mutual exposure events'. However, shared exposures between case 4 and the others were sought. The only spatial-temporal overlap was with case 1 and occurred during the admission of case 1 to the ward where case 4 worked. Case 4's duties included personal care (not invasive procedures). Conceivably, case 4 may have been exposed while caring for case 1 who required intensive medical support and investigation. Since it was not possible to explore direct contact between the two cases, it is uncertain what such exposure might be.

It is difficult to explain all cases in this outbreak by exposure to a common non-human source. While inconclusive, features consistent with person-person spread are demonstrated. In our view, clinicians and public health specialists should therefore keep an open mind to the possibility of person to person spread of psittacosis despite the received opinion that this generally does not occur.

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