CORRESPONDENCE

Zoonotic *Chlamydia caviae* Presenting as Community-Acquired Pneumonia

TO THE EDITOR: *Chlamydia caviae* is a member of the family of gram-negative intracellular bacteria Chlamydiaceae. Bacteria of this family cause a broad spectrum of diseases in animals and humans and are currently subdivided into a single genus and 11 species.[1] Among these species, *C. psittaci* and *C. abortus* are known for their zoonotic potential, causing psittacosis and abortion, respectively, in humans.[2,3] In contrast, only one case of mild conjunctivitis has previously been documented in association with *C. caviae*.[4]

We describe three unrelated cases of infection in otherwise healthy adults in their early 30s who had respiratory failure caused by severe community-acquired pneumonia (see chest radiographs in Section S1 of the Supplementary Appendix, available with the full text of this letter at NEJM.org) after exposure to ill guinea pigs (Table 1). The three cases, which appeared over a period of approximately 3 years, occurred in persons from different families, at different hospitals, and in different geographic areas. Two patients were treated with mechanical ventilation in the intensive care unit for several days.

Chlamydia DNA was detected in specimens obtained from the respiratory tract, serum, or both in all three patients, and the species was identified as *C. caviae* by means of the Dutch national surveillance system for psittacosis, in which samples identified as positive in a polymerase-chain-reaction assay are genotyped by sequencing a part of the gene that encodes the outer membrane protein A, *ompA*[5] (details are provided in Sections S2 and S3 in the Supplementary Appendix). In one patient, chlamydia seroconversion was detected by means of complement fixation, which revealed an increase in the antibody titer by a factor of 4 (see Section S3 in the Supplementary Appendix for details). No other causes of community-acquired pneumonia were found (see Section S4 in the Supplementary Appendix). Although different antibiotic regimens were used to treat the patients, in accordance with local protocols (Table 1), all three patients recovered after being treated with doxycycline.

One of the guinea pigs owned by Patient 2 showed signs of respiratory illness before community-acquired pneumonia developed in the patient. *C. caviae* was isolated from a conjunctival swab. To confirm transmission between this guinea pig and its keeper, we performed a tandem repeat analysis and sequenced the *ompA* coding region in a sample of the patient's bronchoalveolar lavage fluid (GenBank accession numbers, KY777669 and KY777670), the guinea pig isolate (GenBank numbers, KY777661 and KY777662), and several samples from other *C. caviae* strains (GenBank numbers, KY777663–KY777668). The sequences of ompA and the single variable-number tandem-repeat (VNTR) region that were identified (from among 27 potential VNTRs) were identical in the bronchoalveolar lavage fluid from the patient and her guinea pig and different from the *C. caviae* reference strain GPIC (GenBank accession number, AE015925; details are provided in Sections S5 through S10 in the Supplementary Appendix). This finding is in line

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Table 1. Patient Data and Findings.*

Characteristics	Patient 1	Patient 2	Patient 3
Before hospitalization			
Appearance of symptoms	February 2013	September 2014	September 2015
Age (yr)	32	31	34
Sex	Male	Female	Female
Medical history	Unremarkable	Traumatic epidural hematoma (in 1991), post-traumatic stress disorder, and obesity	Fibromyalgia
Clinical signs	Fever, malaise, coughing, headache, myalgia	Fever, coughing, shortness of breath, myalgia	Fever, headache, drowsiness, nausea, vomiting, abdominal pain
Treatment	No response to amoxicillin–clavulanic acid plus NSAIDs, prescribed by general practitioner	No response to amoxicillin–clavulanic acid plus NSAIDs, prescribed by general practitioner	No treatment
Diagnosis	Pneumonia and severe respiratory insufficiency; hospitalization needed	Pneumonia and severe respiratory insufficiency; hospitalization needed	Pneumonia; hospitalization needed
During hospitalization			
Clinical situation	ICU admission, mechanical ventilation	ICU admission, mechanical ventilation	Admission to general ward
Laboratory findings			
C-reactive protein (mg/liter)	485	379	212
Reference range at local hospital	≤8	≤8	≤5
White-cell count (per mm^3)	13,300	3600	NA
Reference range at local hospital	4000–10,000	4000–10,000	
Sodium (mmol/liter)	131	NA	NA
Reference range at local hospital	135–145	NA	
Alkaline phosphatase (U/liter)	NA	294	171
Reference range at local hospital		33–98	0–120
Alanine aminotransferase (IU/liter)	NA	NA	43
Reference range at local hospital			<35
γ-Glutamyltransferase (U/liter)	NA	111	NA
Reference range at local hospital		<38	
Lactate dehydrogenase (U/liter)	NA	420	NA
Reference range at local hospital		<247	
Diagnostic measures	Radiography and examination of bronchoalveolar-lavage fluid followed by positive PCR assay for *Chlamydia psittaci*; further typing revealed *C. caviae*	Radiography and examination of bronchoalveolar-lavage fluid followed by positive PCR assay for *C. psittaci*; further typing revealed *C. caviae*	Radiography and sputum smear followed by positive PCR assay for *C. psittaci*; further typing revealed *C. caviae*
Treatment	Ceftriaxone plus ciprofloxacin, followed by ceftriaxone plus doxycycline, followed by meropenem plus doxycycline	Penicillin plus ciprofloxacin, followed by doxycycline plus ciprofloxacin	Amoxicillin plus ciprofloxacin, followed by doxycycline
Additional anamnesis	2 Guinea pigs at home that had respiratory symptoms before development of patient's community-acquired pneumonia	25 Guinea pigs at home that had respiratory symptoms before development of patient's community-acquired pneumonia	Guinea pigs with conjunctivitis and rhinitis and a dyspnoeic, indolent wild rabbit at workplace (a veterinary clinic)

* ICU denotes intensive care unit, NA not available, NSAIDs nonsteroidal antiinflammatory drugs, and PCR polymerase chain reaction.

with a *C. caviae* transmission event, although the molecular features described (see Sections S8 through S10 in the Supplementary Appendix) were not unique but were shared with two German *C. caviae* strains.

Altogether, the data imply that the transmission of *C. caviae* from guinea pig to human in these cases resulted in severe community-acquired pneumonia. Both veterinarians and physicians should be aware of the zoonotic potential of *C. caviae*. Although the extent to which *C. caviae* actually contributes to community-acquired pneumonia is unclear, awareness may help to clarify this issue.

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Early, Goal-Directed Therapy for Septic Shock — A Patient-Level Meta-Analysis

TO THE EDITOR: In reporting the results of their meta-analysis of individual patient data from three trials, the Protocolized Resuscitation in Sepsis Meta-Analysis (PRISM) investigators (June 8 issue)[1] conclude that early, goal-directed therapy (EGDT) did not result in better outcomes than usual care in the resuscitation of patients with septic shock. I was hoping that the meta-analysis would answer an important question — what is usual care? EGDT is a well-defined intervention to guide hemodynamic resuscitation according to targets for central venous pressure, mean arterial blood pressure, urinary output, and central venous oxygen saturation.

Which monitoring tools and hemodynamic targets (other than central venous pressure, mean