Parachlamydia and *Rhabdochlamydia*: Emerging Agents of Community-Acquired Respiratory Infections in Children

To the Editor—Besides viruses, *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* are common causes of community-acquired respiratory infections (CARI) in children. However, the causal agent of CARI remains unknown in many cases [1]. Growing evidence suggests that *Chlamydia*-related bacteria might have a pathogenic role in humans [2, 3]. *Parachlamydia acanthamoebae* and *Protochlamydia naegleriophila* have been detected in respiratory clinical samples [4, 5], and the role of *Parachlamydia acanthamoebae* in pneumonia is supported by in vitro studies and animal models [6]. *Rhabdochlamydia crassificans* and *Rhabdochlamydia porcellionis* are intracellular pathogens of arthropods that also belong to the *Chlamydiales* order [7, 8]. A recent analysis suggests that *Rhabdochlamydia* species might affect morbidity and mortality in premature newborns [9], but their role in respiratory infections is unknown.

Using 3 previously described real-time polymerase chain reactions (PCRs) for the detection of *P. acanthamoebae, P. naegleriophila,* and *Rhabdochlamydia* spp. [4, 5, 9], we aimed at assessing the prevalence and clinical significance of these bacteria in respiratory secretions of children. All available respiratory samples of children hospitalized between September 2004 and October 2006 with a diagnosis of CARI were retrospectively tested. Tracheobronchitis was defined by the presence of a new cough with at least one of the following signs (dyspnea, sputum, fever $\geq$38°C) or a diagnosis of upper respiratory tract infection in the medical record. Pneumonia was considered in the presence of the above criteria and a new infiltrate on chest x-ray. As controls, we used respiratory samples of 6 children hospitalized during the same period without evidence of respiratory infection at time of sampling. Multiplex PCR assay for the detection of *M. pneumoniae* and *C. pneumoniae* was also performed using previously reported primers and probes [10].

Twenty-nine patients were included (13 males, 16 females; median age, 5 years; range, 3 months to 18 years). Most (90%) respiratory samples were nasopharyngeal secretions. Positive results for *Chlamydia*-related bacteria were obtained in 14 (48%) of 29 patients with CARI (2 *Parachlamydia*, 11 *Rhabdochlamydia*, 1 both *Para- and Rhabdochlamydia; Protochlamydia* was not recovered) and 0 (0%) of 6 controls ($P = .06$). Considering only cases of documented pneumonia ($n = 21$), the rate of positive results was 52% ($P = .05$ when compared with controls). Clinical characteristics of the 14 patients with CARI and positive PCR results for *Parachlamydia* or *Rhabdochlamydia* species are summarized in Table 1. An alternative causal agent of pneumonia was documented in 2 cases (*M. pneumoniae* and *S. pneumoniae*). Of the 12 patients without alternative etiology, 5 (42%) received a macrolide (to which *Chlamydia*-related bacteria are susceptible). Interestingly, one patient who did not respond to initial beta-lactam monotherapy experienced a rapid improvement after start of clarithromycin.

In conclusion, our study revealed a high prevalence of positive respiratory samples for *Parachlamydia* and *Rhabdochlamydia* species. A similar prevalence has been recently reported in premature neonates with respiratory distress syndrome [9], which suggests that airways colonization with these *Chlamydia*-related bacteria is common. Their pathogenic role in CARI is supported by the fact that these bacteria were not recovered from respiratory samples of patients without evidence of respiratory infection and were the only possible causal agents of pneumonia in 12 of 14 cases.

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Table 1. Clinical Characteristics of Respiratory Infection in Children With Positive PCR Results for *Chlamydia*-Related Bacteria

Sex/age/ underlying condition	Type of pulmonary infection	Other symptoms/ signs	Alternative etiology	Supportive measures	Treatment (response)
Parachlamydia acanthamoebae					
F/13 y/pinealoblastoma (neutropenia)	Bilateral interstitial pneumonia	Enterocolitis	…	…	Meropenem, vancomycin (complete)
M/15 y/-	Unilateral alveolar pneumonia	Pleural effusion	…	…	Amoxicillin/clavulanate, clarithromycin (complete)
Rhabdochlamydia spp.					
F/1 y/-	Tracheobronchitis	…	*S.pneumoniae* (urinary antigen)	Invasive ventilation	Ceftriaxone, clarithromycin (complete)
F/2 y/-	Unilateral alveolar pneumonia	…	…	Oxygen supply	Amoxicillin/clavulanate (complete)
M/2 y/-	Unilateral alveolar pneumonia	Rhinitis, pleural effusion	…	…	Amoxicillin/clavulanate, clarithromycin (complete)
M/2 y/cystic fibrosis	Bilateral alveolar pneumonia	…	…	…	Amoxicillin/clavulanate (complete)
F/3 y/-	Bilateral alveolar pneumonia	Rhinitis, pharyngitis, seizures	*M. pneumoniae* (nosal swab, PCR)	…	Clarithromycin (complete)
M/5 y/osteosarcoma (neutropenia)	Unilateral alveolar pneumonia	Rhinitis	…	…	Ceftriaxone, amikacin (complete)
F/9 y/ methylmalonicacidemia	Unilateral interstitial pneumonia	…	…	…	Amoxicillin/clavulanate (no response); then: clarithromycin (complete)
F/11 y/-	Unilateral interstitial pneumonia	Otitis media	…	Oxygen supply	Clarithromycin (complete)
F/14 y/cystic fibrosis	Unilateral alveolar pneumonia	…	…	Non invasive mechanical ventilation	Imipenem, ciprofloxacin (complete)
F/15 y/-	Unilateral alveolar pneumonia	Pleural effusion	…	Oxygen supply	Amoxicillin/clavulanate, clarithromycin (complete)
M/17 y/-	Tracheobronchitis	…	…	…	No treatment (complete)
Parachlamydia acanthamoebae and *Rhabdochlamydia* spp.					
M/1 month/-	Tracheobronchitis	Conjunctivitis	…	…	No treatment (complete)

NOTE. y, year-old.

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