Journal of Microbiology, Immunology and Infection (2015) 48, 632–638

Available online at www.sciencedirect.com

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journal homepage: www.e-jmii.com

ORIGINAL ARTICLE

Clinical and epidemiological characteristics in children with community-acquired mycoplasma pneumonia in Taiwan: A nationwide surveillance

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Received 22 April 2014; received in revised form 18 July 2014; accepted 7 August 2014
Available online 11 October 2014

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http://dx.doi.org/10.1016/j.jmii.2014.08.003

KEYWORDS
Children;
Community-acquired pneumonia;
Mycoplasma pneumoniae

Background: Community-acquired pneumonia (CAP) is the leading cause of hospitalization of children. *Mycoplasma pneumoniae* is one of the most common pathogens. The disease severity is diverse, and the diagnosis remains a challenge to clinical pediatricians. The aims of this study are to provide a nationwide surveillance of the epidemiology and clinical manifestations of community-acquired mycoplasma pneumonia (CAMP) in children in Taiwan.
Methods: The medical records of children enrolled by the Taiwan Pediatric Infectious Disease Alliance (TPIDA) project during 2010—2011 were reviewed. Hospitalized children with segmental or lobar pneumonia were included. The demographic, clinical, laboratory and radiographic data were analyzed. Nasopharyngeal swabs, pleural effusion, and serum were collected for multiplex viral and bacterial polymerase chain reaction (PCR), mycoplasma immunoglobulin M (IgM), or paired immunoglobulin G (IgG) titer.
Results: There were overall 127 children with CAMP. Among them, 16 (12.6%) children had PCR and IgM positivity, 74 (58.3%) children had a positive serologic study, 34 (27.8%) children had positive PCR detection, and three (2.4%) children had paired IgG above a four-fold increase. Enrolled patients were divided into two groups before and after the age of 5 years. Children younger than 5 years or younger had a significantly longer hospitalization, higher intensive care unit (ICU) admission rates, and more complications. They were more frequent to receive oxygen supplementation and even surgical intervention. The white blood cell counts and C-reactive protein levels were higher in children 5 years old or younger.
Conclusion: Mycoplasma pneumoniae is an important etiology of CAP in children 5 years or younger. They had a longer length of hospitalization, higher inflammatory responses, and more complications, compared to children older than 5 years.

Introduction

Pneumonia is a common complication of respiratory tract infection. For younger children, elders, and immunocompromised individuals, pneumonia can lead to death. According to World Health Organization (WHO), pneumonia was a major cause of mortality among children in 2010.[1] Pneumonia accounts for 21% of mortality in children younger than 5 years in African and Eastern Mediterranean regions and 12% of mortality in the Americas and in European regions.[2] In Taiwan, pneumonia was the fifth cause of death in children 1—14 years old in 2012.[3] Community-acquired pneumonia (CAP) is also a common cause of hospitalization of children. Community-acquired pneumonia is usually clinically classified as "typical" or "atypical" pneumonia. Typical pneumonia is caused by bacteria and atypical pneumonia is caused by *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, or viruses. In previous reports, *M. pneumoniae* has an important role in pediatric CAP.

M. pneumoniae is a small fastidious bacterium that lacks a cell wall. This unique feature makes it invisible on Gram stain, difficult to culture, and even insensitive to general antibiotics such as the beta-lactams used to treat CAP. As a causative pathogen of atypical pneumonia, *M. pneumoniae* infection can occur at any age. School-aged children and adolescents have the highest attack rates. Children younger than 3 years tend to develop upper air way infection, whereas children 5～20 years tend to develop acute bronchitis and pneumonia.[4-6] Fever and cough are the most common symptoms,[7] but extrapulmonary manifestations occur occasionally. The severity of *M. pneumoniae* infection varies from self-limited upper respiratory tract infection to complicated pneumonia to even mortality.[8] The prevalence of macrolide-resistant *M. pneumoniae* is rising in Japan[9] and China,[10] although recent studies show that the recent resistance rate is 12.3—23% in Taiwan.[11,12] Macrolide remains the first-line drug to treat *M. pneumoniae* infection.

The "gold standard" for the diagnosis of *M. pneumoniae* infection is still lacking. Single positivity of serum immunoglobulin M (IgM) and a four-fold or greater titer increase in serum immunoglobulin G (IgG) are the most common laboratory diagnostic tools. Polymerase chain reaction (PCR) is a sensitive but time-consuming method. The cost and technique-dependent procedure limits the use of PCR. Prompt diagnosis of *M. pneumoniae* infection remains challenging in the current era. By using radiographic findings, the aims of this study are to provide nationwide surveillance of the epidemiology and clinical manifestations of community-acquired mycoplasma pneumonia (CAMP) in hospitalized children in Taiwan.

Methods

Taiwan Pediatric Infectious Disease Alliance

Taiwan Pediatric Infectious Disease Alliance (TPIDA) is a collaborative consortium established by nine pediatric infectious disease departments of tertiary medical centers, which include the National Taiwan University Hospital (Taipei City, Taiwan), Mackay Memorial Hospital (Taipei City, Taiwan), Chang Gung Memorial Hospital at Linkou (Linkou, Taiwan), China Medical University Hospital (Taichung City, Taiwan), National Cheng Kung University