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The epidemiology and clinical features of *Mycoplasma pneumoniae* infection in neonates

Feng Huang[a,1], *Lianghua Lu*[b,1], *Wujun Jiang*[a], *Yongdong Yan*[a,*], *Wei Ji*[a], *Bin Yang*[c], *Shenglin Yu*[b]

[a] *Children's Hospital of Soochow University, Department of Respiratory Medicine, Suzhou, China*
[b] *Children's Hospital of Soochow University, Department of Neonatology, Suzhou, China*
[c] *Children's Hospital of Soochow University, Department of Clinical Lab, Suzhou, China*

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ABSTRACT

Objectives: This retrospective study was aimed to explore the epidemiological and clinical profiles of *Mycoplasma pneumoniae* infection in neonates.
Methods: From 2011 to 2014, 1322 hospitalized neonates with lower respiratory tract infections were screened for *Mycoplasma pneumoniae* by detection of *Mycoplasma pneumoniae* antibodies using Serion ELISA classic *Mycoplasma pneumoniae* kits.
Results: *Mycoplasma pneumoniae* was identified in 89 (6.7%) patients. The age ranged from 1 day to 28 days with a median of 22 days. The male to female ratio was 1.15:1. *Mycoplasma pneumoniae* infection peaked in spring (from March through May) and winter (from December through February). Compared with non-*Mycoplasma pneumoniae* infected neonates, those with *Mycoplasma pneumoniae* infection were older, presented fever more frequently, and had less tachypnea.
Conclusions: *Mycoplasma pneumoniae* could be an important etiologic agent for respiratory tract infection in neonates. In neonates *Mycoplasma pneumoniae* infection was usually associated with older age, presence of fever, and less tachypnea. *Mycoplasma pneumoniae* infection in neonates tends to be a mild process.

Introduction

Mycoplasma pneumoniae (MP) is an important cause of community-acquired pneumonia in children.[1,2] MP causes respiratory tract infection in all age groups.[3] Nonetheless, the main burden of infection is typically found in school-age children. An increasing incidence of MP infection and disease in children and infants under five years is being reported.[4–7] However, the relevance of MP as an etiological agent of neonatal lower respiratory tract infections (LRTIs) remains unclear.

To the best of our knowledge, MP as an etiological agent of neonatal LRTIs has occasionally been reported,[8,9] but no studies have been conducted to elucidate the role of MP in neonatal LRTIs in China and other regions throughout the world. Thus it is important to delineate the extent of involvement of MP in neonatal LRTIs.

* *Corresponding author.*
E-mail address: yyd3060@126.com (Y. Yan).
[1] These authors contributed equally to this work.
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Toward that end, we investigated the occurrence of MP infection in 109 hospitalized neonates with LRTIs from 2011 to 2014 and further analyzed the incidence, clinical, and laboratory data of these cases.

Materials and methods

Patients

A total of 1322 neonates hospitalized with LRTIs in Children's Hospital of Soochow University, China, from Jan 2011 to Dec 2014 were selected for this observational retrospective study. To be included in this study, patients had to be aged less 29 days and be hospitalized for LRTIs during the study period. LRTI was defined as the presence of at least three of the following signs and symptoms: cough, tachypnea, chest retractions, abnormal auscultatory findings (wheezing or crackles), and radiologic evidence indicative of lower respiratory tract infection. The exclusion criteria were: neonates with a vertical infection (i.e., an infection transmitted from mother to child) or infection acquired during delivery. The study was approved by the Ethics Committee of Children's Hospital of Soochow University.

Data collection

Patient demographic data, laboratory and radiographic reports were collected and reviewed. Laboratory data including peripheral white blood cell count, neutrophil and lymphocyte proportions, C-reactive protein (CRP), serology for MP, and nasopharyngeal specimens for viral testing were recorded and further analyzed.

Serology for MP

Specific IgM and IgG antibodies against MP were detected in serum samples of patients in the acute phase of MP (on admission) and convalescent phase (on discharge), using a commercial ELISA kit (Serion ELISA classic MP IgG/IgM, Institute Virion/Serion, Würzburg, Germany) according to the manufacturer's instructions. The presence of IgM in the convalescent phase was used as criteria of current MP infection.

Nasopharyngeal specimen collection

Nasopharyngeal secretions were collected from each study participant within 24 h after admission by a lab technician as previously described. Briefly, an aseptic plastic sputum catheter was inserted into the nostril to a depth of about 7–8 cm until reaching the pharynx. Approximately 2 mL of nasopharyngeal secretions was collected by applying negative pressure. The sample was mixed with 4–8 mL PBS, and centrifuged for 10 min at 300–500 rpm. The supernatant was discarded and the pellet was mixed with 4–8 mL PBS and centrifuged for an additional 10 min. The specimens were centrifuged and were stored at −80° C until tested.

Detection of viruses

All nasopharyngeal swabs were tested by immunofluorescence for antigen detection of seven common viruses, including respiratory syncytial virus (RSV), adenovirus (ADV), influenza viruses (IV) A and B, and parainfluenza viruses (PIV) 1, 2 and 3.

Statistical analysis

We used *n* (%) for categorical variables and median (range) for continuous variables with non-normal distribution or mean (SD) for those with normal distribution. We assessed differences in categorical variables with the χ^2 test. We calculated 95% CI for differences in medians with an exact test. SPSS (version 17.0) software was used for all statistical analysis. Multivariate logistic regression analysis was used to analyze variables associated with detection of MP.

Results

Patient demographics

A total of 1322 neonates hospitalized with LRTIs were included in this study. Of those, MP was identified in 89 (6.7%) patients, with RSV in 255 (19.3%) cases, 59 (4.7%) with IV-A, 13 (1.0%) with PIV-3, 9 (0.7%) with IV-B, and 8 (0.6%) with ADV. Multi-viruses were identified in 36 (2.7%) patients. Among the 89 patients with MP infection, 16 patients (17.8%) were co-infected with RSV, and one (1.1%) was co-infected with influenza A.

Age ranged from 1 day to 28 days with a median of 22 days. The male to female ratio was 1.15:1. The birth weight ranged from 2150 to 4000 g with a median of 3450 g. Gestational age ranged from 33 to 41 weeks with a median of 37 weeks.

Epidemiology of MP infection

The age distribution of MP infection in neonates is shown in Fig. 1. Three (3.4%) cases were aged 1–7 days, 11 (12.4%) 8–14 days, 28 (31.5%) 15–21 days, and 47 (52.8%) were aged 22–28 days. Thus, the incidence of MP infection in neonates increases with age.

The monthly distribution of MP infection in neonates is shown in Fig. 2. MP infection peaked in spring (from March

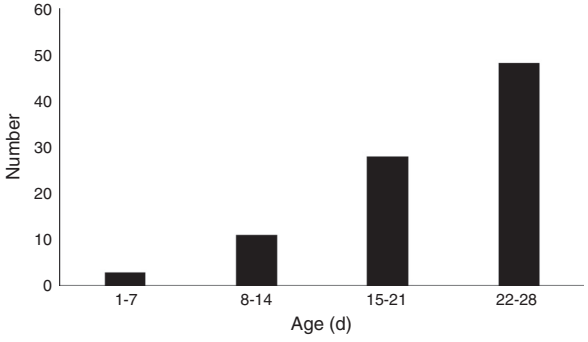

Fig. 1 – The age distribution of *Mycoplasma pneumoniae* infection in neonates.