Age-Stratified Analysis of Clinical Characteristics and High-Risk Factors for Lobar Pneumonia in Pediatric Mycoplasma pneumoniae Pneumonia: A Postprint

Authors: Zeng Ling, Xie Leyun, Yu Renhe, Song Lin, Zeng Saizhen, Xie Leyun

Date: 2025-07-09T00:00:00+00:00

Abstract

Background: Mycoplasma pneumoniae pneumonia (MPP) is a common community-acquired pneumonia in children in China. Its clinical features and prognosis are closely related to age and imaging progression, but systematic studies on age-stratified combined with imaging analysis are still insufficient. Objective: To investigate the clinical characteristics of MPP in different age groups and the high-risk factors for lobar pneumonia, so as to provide help for precise diagnosis and treatment. Methods: A retrospective study included 895 hospitalized children with MPP from Hunan Provincial People' s Hospital from August 2023 to April 2024 as research subjects. They were divided into <5 years group and $ $5 years group according to age, and further divided into <5 years non-lobar pneumonia subgroup, <5 years lobar pneumonia subgroup, $ $5 years non-lobar pneumonia subgroup, and $ $5 years lobar pneumonia subgroup according to imaging results. General data, laboratory indicators, treatment and prognosis data were collected, and differences between groups were compared. Multiplex real-time fluorescent quantitative PCR was used to detect respiratory pathogen nucleic acids, and Taqman fluorescent probe PCR technology was used to detect MP nucleic acids and drug resistance mutation site genes. Multivariate Logistic stepwise regression analysis was used to analyze the risk factors for lobar pneumonia. Results: Among the 895 children with MPP, there were 418 males (46.7%) and 477 females (53.3%), with a median age of 7.09 (5.1, 8.9) years. There were 218 cases (24.4%) in the <5 years group and 677 cases (75.6%) in the $ $5 years group. The <5 years non-lobar pneumonia subgroup had 164 cases (18.3%), the <5 years lobar pneumonia subgroup had 54 cases (6.0%), the $ $5 years non-lobar pneumonia subgroup had 304 cases (34.0%), and the $ $5 years lobar pneumonia subgroup had 373 cases (41.7%). The $ $5 years group had higher proportions of cough, fever,

rales, diminished breath sounds, headache, dizziness, peak fever $ $39.0°C, sore throat, as well as longer fever duration, higher neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), D-dimer levels, MP drug resistance rate, bronchoscopy proportion, methylprednisolone treatment, lobar pneumonia proportion, and nasal catheter oxygen therapy proportion than the <5 years group, while the proportions of wheezing, three concave sign, lactate dehydrogenase (LDH) levels, gamma globulin use, non-invasive mechanical ventilation (CPAP) and pediatric intensive care unit (PICU) admission were lower than those in the <5 years group, with statistically significant differences (P<0.05). The <5 years lobar pneumonia subgroup had lower proportions of allergic constitution, peak fever $ $39.0°C, wheezing, drug resistance, and oxygen therapy than the <5 years non-lobar pneumonia subgroup, while the median age, proportion of diminished breath sounds, WBC, and length of hospital stay were higher than those in the <5 years non-lobar pneumonia subgroup, with statistically significant differences (P<0.05). The $ $5 years lobar pneumonia subgroup had higher proportions of allergic constitution, peak fever $ $39°C, diminished breath sounds, D-dimer, drug resistance, bronchoscopy and methylprednisolone, and longer hospital stay than the $ $5 years non-lobar pneumonia subgroup, while the proportions of wheezing, three concave sign and oxygen therapy were lower than those in the $ $5 years non-lobar pneumonia subgroup, with statistically significant differences (P<0.05). Multivariate Logistic stepwise regression analysis showed that age $ $5 years, allergic constitution, peak fever $ $39.0°C, NLR and MP drug resistance were high-risk factors for lobar pneumonia (P<0.05). Conclusion: The <5 years age group had more obvious pulmonary signs, and needed more oxygen therapy and PICU support; while the $ $5 years group had more obvious extrapulmonary symptoms, longer hospital stay, was more likely to progress to lobar pneumonia, had higher drug resistance rate, and needed glucocorticoids and BAL treatment more commonly. Age $ $5 years, allergic constitution, peak fever $ $39.0°C, NLR and drug resistance are high-risk factors for lobar pneumonia.

Full Text

Age-Stratified Clinical Characteristics and Risk Factors for Lobar Pneumonia in Children with Mycoplasma pneumoniae Pneumonia

ZENG Ling[1], XIE Leyun[1]*, YU Renhe[2], SONG Lin[1], ZENG Saizhen[1]

[1] Department of Pediatrics, Hunan Provincial People' s Hospital/The First Affiliated Hospital of Hunan Normal University, Changsha 410000, Hunan, China
[2] Xiangya School of Public Health, Central South University, Changsha 410013, Hunan, China

Corresponding author: XIE Leyun, Associate chief physician; E-mail: 258137134@qq.com

Abstract

Background: Mycoplasma pneumoniae pneumonia (MPP) is a common form of community-acquired pneumonia in children in China. Clinical features and outcomes of MPP are closely associated with age and radiographic progression, yet systematic studies examining age-stratified clinical characteristics combined with imaging analysis remain limited.

Objectives: To investigate the clinical manifestations of MPP in children across different age groups and identify risk factors for lobar pneumonia to provide evidence for precision diagnosis and treatment.

Methods: This retrospective study included 895 hospitalized children with MPP at Hunan Provincial People' s Hospital from August 2023 to April 2024. Patients were stratified by age into <5 years and $ $5 years groups, and further subdivided by imaging findings into non-lobar and lobar pneumonia subgroups within each age category. General patient data, laboratory indicators, treatment modalities, and prognostic outcomes were collected and compared across groups. Respiratory pathogen nucleic acids were detected using multiplex real-time fluorescence quantitative PCR, while MP nucleic acid and drug resistance mutation sites were identified using TaqMan fluorescent probe PCR technology. Multivariate logistic stepwise regression was employed to analyze risk factors for lobar pneumonia.

Results: Among the 895 MPP patients, 418 (46.7%) were male and 477 (53.3%) were female, with a median age of 7.09 years (interquartile range [IQR] 5.1–8.9). The <5 years group comprised 218 patients (24.4%), while the $ $5 years group included 677 patients (75.6%). Imaging subgroups were distributed as follows: <5 years non-lobar pneumonia (164 cases, 18.3%), <5 years lobar pneumonia (54 cases, 6.0%), $ $5 years non-lobar pneumonia (304 cases, 34.0%), and $ $5 years lobar pneumonia (373 cases, 41.7%). Children aged $ $5 years exhibited higher proportions of cough, fever, rales, diminished breath sounds, headache, dizziness, fever peak $ $39.0°C, sore throat, longer fever duration, elevated neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), D-dimer levels, MP resistance rate, bronchoscopy utilization, methylprednisolone treatment, lobar pneumonia incidence, and nasal cannula oxygen therapy compared to the <5 years group (P<0.05). Conversely, the $ $5 years group showed lower rates of wheezing, three-concave sign, lactate dehydrogenase (LDH) levels, gamma globulin administration, non-invasive mechanical ventilation (CPAP), and pediatric intensive care unit (PICU) admission (P<0.05). Within the <5 years cohort, the lobar pneumonia subgroup demonstrated lower proportions of allergic constitution, fever peak $ $39.0°C, wheezing, drug resistance, and oxygen therapy, but higher median age, diminished pulmonary breath sounds, white blood cell count (WBC), and hospitalization duration compared to the non-lobar subgroup (P<0.05). In the $ $5 years cohort, the lobar pneumonia sub-

group showed higher proportions of allergic constitution, fever peak $ $39°C, diminished breath sounds, D-dimer levels, drug resistance, bronchoscopy and methylprednisolone utilization, and longer hospital stays, but lower rates of wheezing, three-concave sign, and oxygen therapy (P<0.05). Multivariate logistic stepwise regression analysis identified age $ $5 years, allergic constitution, fever peak $ $39.0°C, elevated NLR, and MP resistance as independent risk factors for lobar pneumonia (P<0.05).

Conclusions: Children <5 years exhibited more pronounced pulmonary signs and greater need for oxygen therapy and PICU support, whereas those $ $5 years showed more prominent extrapulmonary symptoms, longer hospitalization, higher susceptibility to lobar pneumonia progression, increased drug resistance rates, and more frequent requirement for glucocorticoid and bronchoalveolar lavage (BAL) therapy. Age $ $5 years, allergic constitution, fever peak $ $39.0°C, NLR elevation, and MP resistance constitute high-risk factors for lobar pneumonia development.

Keywords: Mycoplasma pneumoniae pneumonia; Children; Lobar pneumonia; Clinical features; Prognosis

Introduction

Mycoplasma pneumoniae (MP) represents a significant pathogen responsible for community-acquired pneumonia in children. Epidemiological studies indicate that MP infection accounts for 10–30% of pediatric pneumonia cases, with incidence rates reaching up to 50% during epidemic peaks. MP transmits via respiratory droplets, with universal susceptibility across age groups but particular vulnerability in children. The pathogen exhibits a typical epidemic cycle of 3–7 years, with a global outbreak occurring during 2015–2016 and gradually increasing positivity rates in 2019. During the COVID-19 pandemic in 2020, non-pharmaceutical interventions (NPIs) effectively limited transmission of MP and other respiratory pathogens. Following the relaxation of NPIs in early 2023, multiple countries worldwide experienced a resurgence in MP and other respiratory pathogen infections. In China, pediatric MPP cases increased from June 2023, with a sharp surge in October–November, prompting close monitoring by the World Health Organization. Notably, the 2023 MPP epidemic in China exhibited distinct characteristics, including infection in younger children, elevated macrolide resistance rates, increased proportions of severe cases and mixed infections, and a high prevalence of lobar pneumonia on chest imaging. These evolving patterns pose new challenges for clinical management of pediatric MPP. This study investigates age-stratified clinical characteristics and risk factors for lobar pneumonia to provide scientific evidence for optimizing diagnostic and therapeutic strategies and improving clinical outcomes.

Methods

Study Design and Population This retrospective study enrolled 895 children with confirmed MPP hospitalized at the Children' s Medical Center of Hunan Provincial People' s Hospital (The First Affiliated Hospital of Hunan Normal University) between August 2023 and April 2024. Inclusion criteria comprised: (1) age 29 days to 18 years; (2) diagnosis according to the Chinese guidelines for diagnosis and treatment of MPP in children (2023 edition); and (3) confirmed pure MPP cases with positive MP nucleic acid testing and exclusion of: (i) mixed infections with other detected respiratory viruses; (ii) positive blood or sputum cultures during hospitalization; (iii) confirmed diagnoses of other pathogen co-infections; (iv) comorbid malignancies, hematologic disorders, major organ malformations, or severe immunodeficiency; (v) chronic lung conditions including bronchial asthma, bronchopulmonary dysplasia, or recurrent respiratory infections; (vi) glucocorticoid or immunomodulator use within one month prior to admission; and (vii) incomplete clinical data. All patient data were reported anonymously. The study was approved by the institutional ethics committee (approval number: ZY2024340), with waived informed consent for specimen collection.

Data Collection General patient information including sex, age, and allergic constitution was extracted from electronic medical records. Allergic constitution was defined by: (1) history of allergic asthma, eczema, urticaria, or allergic rhinitis; (2) detection of $ $2 allergens or elevated serum total IgE within the past year; (3) food allergy history; or (4) positive food challenge or skin prick test.

Laboratory parameters collected within 24 hours of admission included white blood cell count (WBC), neutrophil percentage (N%), neutrophil-to-lymphocyte ratio (NLR), C-reactive protein (CRP), platelet-to-lymphocyte ratio (PLR), D-dimer, albumin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), lactate dehydrogenase (LDH), and MP resistance status.

Treatment and prognostic data comprised bronchoscopy, methylprednisolone, gamma globulin administration, hospitalization duration, severe MPP (SMPP), lobar pneumonia, oxygen therapy (including nasal cannula and CPAP), and PICU admission.

Diagnostic Criteria Lobar pneumonia was diagnosed according to the *Zhu Futang Practical Pediatrics* (9th edition) based on chest radiography showing segmental or lobar homogeneous consolidation with air bronchograms and minimal pleural effusion.

Laboratory Testing Respiratory pathogen nucleic acid detection was performed on throat swab specimens collected within 24 hours of admission using multiplex real-time fluorescence quantitative PCR to simultaneously detect adenovirus (ADV), influenza A virus (FluA), influenza B virus (FluB), human rhi-

novirus (HRV), Mycoplasma pneumoniae (MP), and respiratory syncytial virus (RSV) using a commercial kit (Sansure Biotech). Results were interpreted as positive when cycle threshold (CT) values were $ $40.

MP resistance gene detection was conducted on admission day throat swab specimens using TaqMan fluorescent probe PCR technology to identify MP nucleic acid and resistance mutation sites (A2063G and A2064G) using a commercial kit (Sansure Biotech), with strict adherence to manufacturer protocols.

Statistical Analysis Statistical analysis was performed using SPSS 25.0 software. Normally distributed continuous variables were expressed as mean ± standard deviation and compared using independent samples t-test. Non-normally distributed data were presented as median (P25, P75) and compared using nonparametric tests. Categorical variables were expressed as percentages and compared using ^{2} test or Fisher's exact test. Multivariate logistic stepwise regression analysis was conducted to identify risk factors for lobar pneumonia. Statistical significance was defined as P<0.05.

Results

Patient Characteristics The study included 895 children with pure MPP (male: 418 [46.7%]; female: 477 [53.3%]) with a median age of 7.09 years (IQR 5.1–8.9). Patient age ranged from 1 to 15.9 years. Children $ $5 years accounted for three-quarters of cases (677 [75.6%]), while 218 (24.4%) were <5 years. Lobar pneumonia was identified in 427 cases (47.7%), and MP resistance was detected in 422 cases (47.2%). The cohort was distributed across four subgroups: <5 years non-lobar pneumonia (164 [18.3%]), <5 years lobar pneumonia (54 [6.0%]), $ $5 years non-lobar pneumonia (304 [34.0%]), and $ $5 years lobar pneumonia (373 [41.7%]).

Age-Stratified Comparisons Clinical manifestations were dominated by cough (891/895 [99.6%]) and fever (835/895 [93.3%]), with 641 cases (71.6%) exhibiting fever peaks $ $39.0°C and median fever duration of 6 days (IQR 4–7). The $ $5 years group demonstrated significantly higher proportions of cough, fever, rales, diminished breath sounds, headache, dizziness, sore throat, fever peak $ $39.0°C, longer fever duration, and elevated NLR, PLR, D-dimer levels, and MP resistance rate compared to the <5 years group (P<0.05). Conversely, the $ $5 years group showed lower rates of wheezing, three-concave sign, LDH levels, gamma globulin use, CPAP, and PICU admission (P<0.05). No significant differences were observed between groups in allergic constitution, rash, gastrointestinal symptoms (vomiting, abdominal pain), or ALT levels (P>0.05). Although WBC, neutrophil count, CRP, albumin, and AST showed statistical differences, values remained within normal ranges, limiting clinical significance .

Treatment and prognosis also differed significantly by age. Beyond antibiotics, the $ $5 years group exhibited higher rates of bronchoscopy, methylprednisolone treatment, lobar pneumonia incidence, and longer hospitalization, but lower rates of gamma globulin administration, CPAP, nasal cannula oxygen, and PICU admission ($P<0.05$). No significant difference in SMPP incidence was observed between age groups ($P>0.05$) .

Imaging-Stratified Comparisons In the <5 years cohort, the lobar pneumonia subgroup showed higher median age, diminished pulmonary breath sounds, WBC count, and hospitalization duration, but lower proportions of allergic constitution, fever peak $ $39.0°C, wheezing, drug resistance, and oxygen therapy compared to the non-lobar subgroup ($P<0.05$). However, WBC values remained within normal ranges, lacking clinical significance. No significant differences were observed in fever duration, three-concave sign, rales, NLR, PLR, D-dimer, gamma globulin use, SMPP, or PICU admission between subgroups ($P>0.05$) .

In the $ $5 years cohort, the lobar pneumonia subgroup demonstrated higher proportions of allergic constitution, fever peak $ $39.0°C, diminished breath sounds, D-dimer levels, drug resistance, bronchoscopy and methylprednisolone utilization, and longer hospitalization, but lower rates of wheezing, three-concave sign, and oxygen therapy compared to the non-lobar subgroup ($P<0.05$). No significant differences were found in median age, fever duration, rales, WBC, NLR, PLR, gamma globulin use, SMPP, or PICU admission between subgroups ($P>0.05$) .

Risk Factors for Lobar Pneumonia Multivariate logistic stepwise regression analysis, with lobar pneumonia as the dependent variable (no=0, yes=1) and age (<5 years=1, $ $5 years=2), fever peak (<39.0°C=1, $ $39.0°C=2), drug resistance (no=0, yes=1), wheezing, three-concave sign, rales, diminished breath sounds, fever duration, WBC, NLR, PLR, and D-dimer as independent variables, revealed that age $ $5 years (OR=3.406, 95%CI=2.383-4.869, $P<0.001$), allergic constitution (OR=1.887, 95%CI=1.406-2.531, $P<0.001$), fever peak $ $39.0°C (OR=1.721, 95%CI=1.381-2.146, $P<0.001$), drug resistance (OR=1.640, 95%CI=1.219-2.205, $P<0.001$), and elevated NLR (OR=1.137, 95%CI=1.059-1.221, $P<0.001$) were independent risk factors for lobar pneumonia .

Discussion

This study demonstrates that children <5 years exhibit more pronounced pulmonary signs with greater need for oxygen therapy and PICU support, whereas those $ $5 years show more prominent extrapulmonary symptoms, longer hospitalization, higher susceptibility to lobar pneumonia progression, increased drug resistance rates, and more frequent requirement for glucocorticoid and BAL

therapy. The identification of age $ $5 years, allergic constitution, fever peak $ $39.0°C, elevated NLR, and MP resistance as high-risk factors for lobar pneumonia provides critical guidance for clinical management.

The clinical heterogeneity of pediatric MPP is well-recognized. Our findings of cough and fever as predominant symptoms align with previous reports. Age-stratified analysis revealed significant differences in clinical manifestations and inflammatory responses. Children <5 years demonstrated more frequent wheezing and pulmonary signs (rales, three-concave sign), consistent with their narrower airway anatomy and smaller bronchi/alveoli that predispose to gas trapping and impaired gas exchange when infected. In contrast, children $ $5 years exhibited more intense systemic inflammatory responses and extrapulmonary manifestations, including higher fever incidence, longer fever duration, elevated fever peaks, and increased headache, dizziness, and sore throat. This likely reflects more mature immune function and stronger inflammatory reactions in older children. Laboratory findings supported these differences, with significantly elevated inflammatory markers (WBC, N%, NLR, CRP, PLR) in the $ $5 years group. NLR and PLR serve as biomarkers of systemic inflammation and immune regulation, with higher values indicating more severe inflammation and immune imbalance. These results suggest that while younger children show more prominent pulmonary signs, older children exhibit more severe systemic inflammatory responses and extrapulmonary symptoms.

Clinical management and prognosis varied significantly by age and imaging findings. Children $ $5 years were more prone to lobar pneumonia and exhibited higher MP resistance rates, longer hospitalization, and higher fever peaks, yet received more frequent BAL and methylprednisolone therapy. This pattern likely reflects: (1) stronger immune responses in older children causing more alveolar damage; (2) circulation of resistant MP strains limiting first-line antibiotic efficacy; and (3) more aggressive therapeutic interventions for severe cases. Conversely, children <5 years predominantly presented with non-lobar pneumonia, featuring more wheezing, three-concave sign, and higher oxygen/PICU support requirements, suggesting diffuse bronchitis or bronchiolitis as the primary pathological process requiring airway patency and oxygenation support. While lobar pneumonia has been associated with prolonged hospitalization and progression to SMPP, our study found no significant difference in SMPP rates between imaging subgroups, possibly due to timely comprehensive treatment (early BAL, methylprednisolone) that reversed disease progression. Notably, all patients improved or recovered without requiring invasive mechanical ventilation, likely attributable to our aggressive treatment protocol and early oxygen therapy.

Multivariate analysis identified five independent risk factors for lobar pneumonia: age $ $5 years, allergic constitution, fever peak $ $39.0°C, elevated NLR, and MP resistance. Literature reports consistently identify children $ $5 years as the high-incidence age group for MP-induced lobar pneumonia, possibly related to enhanced Th2 immune responses in older children. Allergic constitu-

tion may exacerbate lung tissue damage through IgE-mediated inflammatory cascade activation, as supported by previous studies demonstrating that atopic children with MPP are more prone to pulmonary consolidation. Elevated NLR reflects excessive cellular immune response that may promote consolidation formation. While prolonged fever duration has been reported as a risk factor, our study found that high fever peak rather than duration predicted lobar pneumonia, possibly because early identification of high-risk patients and prompt BAL/methylprednisolone treatment effectively suppressed excessive inflammation and shortened fever duration. The association between resistant MP infection and lobar pneumonia is well-established, as resistant strains may evade macrolide antimicrobial effects and aggravate lung tissue injury.

This study has several limitations. First, only six respiratory pathogens and sputum cultures were used to exclude mixed infections. Second, resistance testing was limited to 23S rRNA gene V region mutation sites A2063G and A2064G, without examining other potential sites such as 2067 and 2617. Third, rare MPP complications were not analyzed. Future high-quality, multicenter, large-sample case-control studies should address these gaps.

In summary, children <5 years exhibit more prominent pulmonary signs requiring oxygen therapy and PICU support, while those $ $5 years show more extrapulmonary symptoms, longer hospitalization, higher risk of lobar pneumonia progression, and increased drug resistance requiring more frequent glucocorticoid and BAL therapy. During MP epidemics, clinicians should monitor MP trends, recognize clinical characteristics, establish early diagnosis, and implement timely intervention to improve outcomes and reduce sequelae. Although various MP vaccines have been developed internationally, their efficacy and safety require further investigation, highlighting the urgent need for effective preventive strategies.

References

[1] LIU K, FU HM, LU Q. New epidemiological progress in Mycoplasma pneumoniae pneumonia in children. *Chinese Journal of Pediatrics*, 2024, 62(07): 696-699. DOI:10.3760/cma.j.cn112140-20240407-00247.

[2] YAMAZAKI T, KENRI T. Epidemiology of Mycoplasma pneumoniae infections in Japan and therapeutic strategies for macrolide-resistant M. pneumoniae. *Frontiers in Microbiology*, 2016, 7: 693. DOI:10.3389/fmicb.2016.00693.

[3] BROWN RJ, NGUIPDOP-DJOMO P, ZHAO HX, et al. Mycoplasma pneumoniae epidemiology in England and Wales: a national perspective. *Frontiers in Microbiology*, 2016, 7: 157. DOI:10.3389/fmicb.2016.00157.

[4] YAN C, SUN HM, ZHAO HQ. Latest surveillance data on Mycoplasma pneumoniae infections in children, suggesting a new epidemic occurring

in Beijing. *Journal of Clinical Microbiology*, 2016, 54(5): 1400-1401. DOI:10.1128/JCM.00184-16.

[5] YUSUF SO, CHEN P. Clinical characteristics of community-acquired pneumonia in children caused by Mycoplasma pneumoniae with or without myocardial damage: a single-center retrospective study. *World Journal of Clinical Pediatrics*, 2023, 12(3): 115-124. DOI:10.5409/wjcp.v12.i3.115.

[6] MEYER SAUTEUR PM, BEETON ML, ULDUM SA, et al. Mycoplasma pneumoniae detections before and during the COVID-19 pandemic: results of a global survey, 2017 to 2021. *Eurosurveillance*, 2022, 27(19): 2100746. DOI:10.2807/1560-7917.ES.2022.27.19.2100746.

[7] National Health Commission of the People' s Republic of China. Guidelines for diagnosis and treatment of Mycoplasma pneumoniae pneumonia in children (2023 edition). *International Journal of Epidemiology and Infectious Diseases*, 2023, 50(02): 79-85. DOI:10.3760/cma.j.cn331340-20230217-00023.

[8] WANG TY, SHEN KL, SHEN Y. *Zhu Futang Practical Pediatrics* [M]. 9th ed. Beijing: People' s Medical Publishing House, 2022: 1-3295.

[9] Subspecialty Group of Respiratory Diseases, Society of Pediatrics, Chinese Medical Association; National Clinical Research Center for Respiratory Diseases; Editorial Board of Chinese Journal of Pediatrics. Evidence-based guidelines for diagnosis and treatment of Mycoplasma pneumoniae pneumonia in children (2023). *Chinese Journal of Pediatrics*, 2024, 62(12): 1137-1144. DOI:10.3760/cma.j.cn112140-20240722-00503.

[10] ZHANG XB, HE W, GUI YH, et al. Current Mycoplasma pneumoniae epidemic among children in Shanghai: unusual pneumonia caused by usual pathogen. *World Journal of Pediatrics*, 2024, 20(1): 5-10. DOI:10.1007/s12519-023-00793-9.

[11] YIN Y, CHEN JD. Diagnosis and treatment concepts and practice for macrolide-resistant Mycoplasma pneumoniae pneumonia in children. *Journal of Clinical Pediatrics*, 2024, 42(03): 177-181.

[12] OCAK M, ÖZ FN, ÇINAR HG, et al. Clinical and radiologic manifestations of Mycoplasma pneumoniae infection in children. *Turkish Journal of Pediatrics*.

[13] QI X, DONG Y, LIN X, et al. Value of neutrophil to lymphocyte ratio, platelet to lymphocyte ratio, and red blood cell distribution width in evaluating the prognosis of children with severe pneumonia. *Evidence-Based Complementary and Alternative Medicine*, 2021, 2021: 1818469. DOI:10.1155/2021/1818469.

[14] JIANG YZ, LIU F. Predictive value of neutrophil-to-lymphocyte ratio in the prognosis of Mycoplasma pneumoniae pneumonia. *Journal of Nanjing Medical University (Natural Sciences)*, 2024, 44(10): 1383-1389.

[15] ALZOUBI O, KHANFAR A. Association between neutrophil to lymphocyte ratio and mortality among community acquired pneumonia patients: a meta-analysis. *Monaldi Archives for Chest Disease*, 2021, 92(3): 2050. DOI:10.4081/monaldi.2021.2050.

[16] HUANG X, GU H, WU R, et al. Chest imaging classification in Mycoplasma pneumoniae pneumonia is associated with its clinical features and outcomes. *Respiratory Medicine*, 2024, 221: 107480. DOI:10.1016/j.rmed.2023.107480.

[17] SUNG M, ROH EJ, LEE ES, et al. Assessment of variables associated with prolonged admission duration in children with Mycoplasma pneumoniae pneumonia. *Clinical Respiratory Journal*, 2022, 16(11): 756-767. DOI:10.1111/crj.13549.

[18] CHEN JY. Study on clinical and bronchoscopic characteristics of children with 23S rRNA resistance gene-positive Mycoplasma pneumoniae pneumonia in bronchoalveolar lavage fluid [D]. China Medical University, 2020. DOI:10.27652/d.cnki.gzyku.2020.000497.

[19] LI J, MAIWALD M, LOO LH, et al. Clinical characteristics of macrolide-resistant Mycoplasma pneumoniae infections among hospitalised children in Singapore. *Annals of the Academy of Medicine, Singapore*, 2022, 51(10): 653-656. DOI:10.47102/annals-acadmedsg.2022213.

[20] SARAYA T. Mycoplasma pneumoniae infection: basics. *Journal of General and Family Medicine*, 2017, 18(3): 118-125. DOI:10.1002/jgf2.15.

[21] SUN LL, YE C, ZHOU YL, et al. Meta-analysis of the clinical efficacy and safety of high- and low-dose methylprednisolone in the treatment of children with severe Mycoplasma pneumoniae pneumonia. *Pediatric Infectious Disease Journal*, 2020, 39(3): 177-183. DOI:10.1097/INF.0000000000002529.

[22] WANG X, GAO MM, YIN L, et al. Risk factors for lobar pneumonia in children with Mycoplasma pneumoniae pneumonia. *Chinese Journal of Nosocomiology*, 2021, 31(02): 1137-1144.

[23] ZHENG Y, MAO G, DAI H, et al. Early predictors of delayed radiographic resolution of lobar pneumonia caused by Mycoplasma pneumoniae in children: a retrospective study in China. *BMC Infectious Diseases*, 2024, 24(1): 414. DOI:10.1186/s12879-024-09289-x.

[24] WANG Z, SUN J, LIU Y, et al. Impact of atopy on the severity and extrapulmonary manifestations of childhood Mycoplasma pneumoniae pneumonia. *Journal of Clinical Laboratory Analysis*, 2019, 33(5): e22887. DOI:10.1002/jcla.22887.

[25] ZHONG LL, YANG J. Clinical characteristics of Mycoplasma pneumoniae pneumonia in atopic children. *Shandong Medical Journal*, 2023, 63(03): 70-73.

[26] BAO YX, LI J, TIAN Y, et al. Atopy: a risk factor of refractory Mycoplasma pneumoniae pneumonia. *Clinical Respiratory Journal*, 2017, 11(6): 931-934.

DOI:10.1111/crj.12439.

[27] CHO YJ, HAN MS, KIM WS, et al. Correlation between chest radiographic findings and clinical features in hospitalized children with Mycoplasma pneumoniae pneumonia. *PLoS One*, 2019, 14(8): e0219463. DOI:10.1371/journal.pone.0219463.

[28] ZHU YW, ZHOU BB, WEI H. Analysis of influencing factors and construction of a nomogram prediction model for lobar pneumonia in children with Mycoplasma pneumoniae pneumonia. *Laboratory Medicine and Clinic*, 2024, 21(16): 2310-2314+2319.

[29] XU SM, ZHANG XW, HAN XG, et al. Study on timing and efficacy of bronchoscopic treatment for lobar Mycoplasma pneumoniae pneumonia. *Chongqing Medicine*, 2023, 52(10): 1383-1389.

[30] JIANG Z, LI S, ZHU C, et al. Mycoplasma pneumoniae infections: Pathogenesis and vaccine development. *Pathogens*, 2022, 11(2): 211. DOI:10.3390/pathogens10020119.

Tables

Table 1 Comparison of demographic characteristics and laboratory findings among different age groups

Table 2 Comparison of treatment and clinical outcomes among children of different age groups

Table 3 Comparison of baseline characteristics and laboratory parameters, clinical treatment and prognosis between <5 years non-lobar pneumonia subgroup and <5 years lobar pneumonia subgroup

Table 4 Comparison of baseline characteristics, laboratory parameters, clinical treatment and prognosis between $ $5 years non-lobar pneumonia subgroup and $ $5 years lobar pneumonia subgroup

Table 5 Multivariable logistic regression analysis of risk factors for lobar pneumonia

---

Note: Figure translations are in progress. See original paper for figures.