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Contents

Quarterly Volume 13 Number 4 December 9, 2024

EDITORIAL

ORIGINAL ARTICLE

Retrospective Cohort Study

Retrospective Study

Observational Study

SYSTEMATIC REVIEWS

CASE REPORT

LETTER TO THE EDITOR

World Journal of Clinical Pediatrics

Quarterly Volume 13 Number 4 December 9, 2024

Contents

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Editorial Board Member of *World Journal of Clinical Pediatrics*, Li-Ye Yang, MD, PhD, Chief Doctor, Precision Medical Center, People's Hospital of Yangjiang, Yangjiang 529500, Guangdong Province, China. yangleeyee@sina.com

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EDITORIAL

Understanding serum inflammatory markers in pediatric *Mycoplasma pneumoniae* pneumonia

Basavraj S Nagoba, Shree V Dhotre, Ajay M Gavkare, Sachin S Mumbre, Pradnya S Dhotre

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Basavraj S Nagoba, Department of Microbiology, Maharashtra Institute of Medical Sciences and Research (Medical College), Latur 413531, India

Shree V Dhotre, Department of Microbiology, Ashwini Rural Medical College, Solapur 413001, India

Ajay M Gavkare, Department of Physiology, Maharashtra Institute of Medical Sciences and Research (Medical College), Latur 413531, India

Sachin S Mumbre, Department of Community Medicine, Ashwini Rural Medical College, Solapur 413006, India

Pradnya S Dhotre, Department of Biochemistry, Ashwini Rural Medical College, Solapur 413001, India

Co-first authors: Basavraj S Nagoba and Shree V Dhotre.

Corresponding author: Basavraj S Nagoba, PhD, Professor, Department of Microbiology, Maharashtra Institute of Medical Sciences and Research (Medical College), Vishwanathpuram, Ambajogai road, Latur 413531, India. dr_bsnagoba@yahoo.com

Abstract

This editorial reflects on the research, which investigates the potential of serum markers to predict the severity of *Mycoplasma pneumoniae* infections. *Mycoplasma pneumoniae* pneumonia (MPP) is a prevalent cause of respiratory infections in children, often leading to significant morbidity. Predicting the severity of MPP can significantly enhance patient management and outcomes. This editorial reviews the role of specific laboratory markers: (1) Lactate dehydrogenase; (2) Interleukin (IL)-6; (3) IL-10; (4) Tumor necrosis factor-α; and (5) D-dimer in predicting the severity of MPP in pediatric patients. Elevated levels of these markers are strongly associated with severe cases of MPP, providing clinicians with valuable tools for early diagnosis and targeted intervention.

Key Words: *Mycoplasma pneumoniae* pneumonia; Pediatric; Severity prediction; Laboratory markers; Clinical management

Core Tip: This editorial underscores the significance of laboratory markers in predicting the severity of *Mycoplasma pneumoniae* pneumonia (MPP) in children. Elevated levels of lactate dehydrogenase, interleukin (IL)-6, IL-10, tumor necrosis factor-α, and D-dimer are identified as critical indicators of severe MPP. Utilizing these markers can aid in the early identification of severe cases, facilitating timely intervention and improving clinical outcomes in pediatric patients.

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INTRODUCTION

Mycoplasma pneumoniae pneumonia (MPP) is a significant cause of respiratory infections in children, leading to substantial morbidity and occasionally severe complications. Early and accurate prediction of MPP severity is crucial for optimizing patient management and improving outcomes. This editorial explores the role of specific laboratory markers; lactate dehydrogenase (LDH), interleukin (IL)-6, IL-10, tumor necrosis factor-α (TNF-α), and D-dimer; in predicting the severity of MPP in paediatric patients.

Wang *et al*[1] published a notable study that highlights the predictive value of serum inflammatory markers in assessing the severity of MPP in children. By analyzing clinical manifestations and laboratory data from 160 children (80 with severe MPP and 80 with mild MPP), the research offers valuable insights into the role of inflammatory cytokines in the progression of disease.

EPIDEMIOLOGY

MPP is a common respiratory infection in children, particularly those aged 5-15 years. It accounts for up to 40% of community-acquired pneumonia cases in this age group[2]. The infection is highly contagious, spreading through respiratory droplets, and can lead to outbreaks in schools and childcare settings. Seasonal variations are noted, with higher incidence rates in the late summer and early fall[3].

According to Bradley *et al*[4], community-acquired pneumonia in children often presents as MPP, especially during these peak seasons, making it imperative to understand and predict the severity of this condition.

Pathophysiology

Mycoplasma pneumoniae is a small, wall-less bacterium that attaches to the respiratory epithelium, causing inflammation and damage[5]. The immune response to this pathogen involves both cellular and humoral components, leading to the production of various cytokines and inflammatory markers[6]. The severity of MPP can be influenced by the host's immune response and the bacterial load.

The pathogenesis of MPP includes direct cytotoxic effects of the pathogen and immune-mediated damage. Studies indicate that the bacterium can induce a robust immune response, causing a cytokine storm in severe cases, which is characterized by elevated levels of IL-6, IL-10, TNF-α, and other inflammatory markers[7].

Clinical presentation

Children with MPP typically present with a range of symptoms, from mild respiratory discomfort to severe pneumonia. Common symptoms include a persistent dry cough, fever, malaise, and headache[8]. In severe cases, patients may develop complications such as pleural effusion, respiratory failure, or extrapulmonary manifestations like encephalitis and hemolytic anemia[9].

A study by Jain *et al*[10] found that MPP often presents with nonspecific symptoms that overlap with other respiratory infections, complicating the initial clinical assessment. Moreover, extrapulmonary manifestations, though less common, can significantly impact patient morbidity and require comprehensive management strategies.

Diagnostic dilemmas

Diagnosing MPP can be challenging due to its nonspecific clinical presentation and the limitations of current diagnostic methods. PCR and serological tests are commonly used but may not always provide timely or definitive results[11]. The identification of reliable laboratory markers that correlate with disease severity is essential for improving diagnostic accuracy and patient management[2].

The utility of LDH, IL-6, IL-10, TNF-α, and D-dimer as biomarkers for severe MPP has been supported by various studies. Elevated levels of these markers have been consistently associated with more severe disease presentations and poorer outcomes[12]. Additionally, these biomarkers can be measured quickly and easily in clinical settings, providing real-time data to guide therapeutic decisions.

Therapeutic strategies

Treatment of MPP typically involves the use of macrolide antibiotics, such as azithromycin or clarithromycin[9]. In cases of macrolide-resistant *Mycoplasma pneumoniae*, alternative antibiotics like doxycycline or fluoroquinolones may be used [13]. Supportive care, including hydration, antipyretics, and respiratory support, is crucial in managing severe cases.

Recent guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of United States emphasize the importance of early and appropriate antibiotic therapy to mitigate complications and improve outcomes [4]. Moreover, adjunctive therapies targeting the inflammatory response, such as corticosteroids, have been explored, though their routine use remains controversial[14].

Clinical implications

The identification of elevated levels of LDH, IL-6, IL-10, TNF-α, and D-dimer as markers of severe MPP has significant clinical implications. These markers can help clinicians to identify patients at higher risk of severe disease, allowing for timely and targeted therapeutic interventions[1]. Early identification and treatment of severe MPP can reduce the risk of complications and improve patient outcomes[3].

Furthermore, integrating these biomarkers into clinical practice can enhance the precision of severity assessments and facilitate personalized treatment approaches. Studies have demonstrated that early and aggressive intervention in patients with elevated biomarker levels can significantly reduce morbidity and healthcare costs[15].

EDITORIAL COMMENTS

The role of laboratory markers in predicting MPP severity represents a promising advancement in paediatric respiratory medicine. LDH, IL-6, IL-10, TNF-α, and D-dimer are readily available and routinely measured in clinical practice, making them practical tools for clinicians. Future research should focus on validating these findings in larger, multicenter studies and exploring the potential for incorporating these markers into clinical decision-making algorithms.

Additionally, the development of predictive models incorporating these biomarkers could further enhance clinical decision-making. For example, a scoring system based on biomarker levels and clinical parameters could provide a comprehensive risk assessment, guiding treatment intensity and resource allocation.

CONCLUSION

Early prediction of severity of MPP using laboratory markers such as LDH, IL-6, IL-10, TNF-α, and D-dimer can significantly enhance patient management and outcomes in pediatric populations. These markers provide valuable insights into disease progression, enabling timely and targeted interventions. As our understanding of MPP pathophysiology and its clinical implications evolves, incorporating these markers into routine clinical practice holds the potential to improve care for children with this common and potentially severe infection.

Future studies should aim to standardize the measurement and interpretation of these biomarkers across different clinical settings. Additionally, investigating the interplay between these markers and other clinical factors could provide a more nuanced understanding of MPP severity and its determinants. Collaborative efforts and multicenter trials will be essential to translate these findings into widespread clinical practice.

FOOTNOTES

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ORCID number: Basavraj S Nagoba 0000-0001-5625-3777; Ajay M Gavkare 0000-0003-4711-5596; Sachin S Mumbre 0000-0002-9169-6001.

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REFERENCES

1 **Wang LP**, Hu ZH, Jiang JS, Jin J. Serum inflammatory markers in children with Mycoplasma pneumoniae pneumonia and their predictive value for Mycoplasma severity. *World J Clin Cases* 2024; **12**: 4940-4946 [PMID: 39109035 DOI: 10.12998/wjcc.v12.i22.4940]

2 **Zhang Y**, Zhou Y, Li S, Yang D, Wu X, Chen Z. The Clinical Characteristics and Predictors of Refractory Mycoplasma pneumoniae Pneumonia in Children. *PLoS One* 2016; **11**: e0156465 [PMID: 27227519 DOI: 10.1371/journal.pone.0156465]

3 **Jain S**, Williams DJ, Arnold SR, Ampofo K, Bramley AM, Reed C, Stockmann C, Anderson EJ, Grijalva CG, Self WH, Zhu Y, Patel A, Hymas W, Chappell JD, Kaufman RA, Kan JH, Dansie D, Lenny N, Hillyard DR, Haynes LM, Levine M, Lindstrom S, Winchell JM, Katz JM, Erdman D, Schneider E, Hicks LA, Wunderink RG, Edwards KM, Pavia AT, McCullers JA, Finelli L; CDC EPIC Study Team. Community-acquired pneumonia requiring hospitalization among U.S. children. *N Engl J Med* 2015; **372**: 835-845 [PMID: 25714161 DOI: 10.1056/NEJMoa1405870]

4 **Bradley JS**, Byington CL, Shah SS, Alverson B, Carter ER, Harrison C, Kaplan SL, Mace SE, McCracken GH Jr, Moore MR, St Peter SD, Stockwell JA, Swanson JT; Pediatric Infectious Diseases Society and the Infectious Diseases Society of America. The management of community-acquired pneumonia in infants and children older than 3 months of age: clinical practice guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America. *Clin Infect Dis* 2011; **53**: e25-e76 [PMID: 21880587 DOI: 10.1093/cid/cir531]

5 **Waites KB**, Talkington DF. Mycoplasma pneumoniae and its role as a human pathogen. *Clin Microbiol Rev* 2004; **17**: 697-728 [PMID: 15489344 DOI: 10.1128/CMR.17.4.697-728.2004]

6 **Waites KB**, Xiao L, Liu Y, Balish MF, Atkinson TP. Mycoplasma pneumoniae from the Respiratory Tract and Beyond. *Clin Microbiol Rev* 2017; **30**: 747-809 [PMID: 28539503 DOI: 10.1128/CMR.00114-16]

7 **Liu B**, Chang X, Yan N. Clinical analysis of the epidemiology and changes in inflammatory indexes of Mycoplasma pneumonia in acute and recovery stage pediatric patients. *Transl Pediatr* 2022; **11**: 1645-1655 [PMID: 36345443 DOI: 10.21037/tp-22-416]

8 **Atkinson TP**, Balish MF, Waites KB. Epidemiology, clinical manifestations, pathogenesis and laboratory detection of Mycoplasma pneumoniae infections. *FEMS Microbiol Rev* 2008; **32**: 956-973 [PMID: 18754792 DOI: 10.1111/j.1574-6976.2008.00129.x]

9 **Principi N**, Esposito S. Management of severe community-acquired pneumonia of children in developing and developed countries. *Thorax* 2011; **66**: 815-822 [PMID: 20965930 DOI: 10.1136/thx.2010.142604]

10 **Jain S**, Finelli L; CDC EPIC Study Team. Community-acquired pneumonia among U.S. children. *N Engl J Med* 2015; **372**: 2167-2168 [PMID: 26017833 DOI: 10.1056/NEJMc1504028]

11 **Kutty PK**, Jain S, Taylor TH, Bramley AM, Diaz MH, Ampofo K, Arnold SR, Williams DJ, Edwards KM, McCullers JA, Pavia AT, Winchell JM, Schrag SJ, Hicks LA. Mycoplasma pneumoniae Among Children Hospitalized With Community-acquired Pneumonia. *Clin Infect Dis* 2019; **68**: 5-12 [PMID: 29788037 DOI: 10.1093/cid/ciy419]

12 **Zhu Z**, Zhang T, Guo W, Ling Y, Tian J, Xu Y. Clinical characteristics of refractory Mycoplasma pneumoniae pneumonia in children treated with glucocorticoid pulse therapy. *BMC Infect Dis* 2021; **21**: 126 [PMID: 33509121 DOI: 10.1186/s12879-021-05830-4]

13 **Morozumi M**, Takahashi T, Ubukata K. Macrolide-resistant Mycoplasma pneumoniae: characteristics of isolates and clinical aspects of community-acquired pneumonia. *J Infect Chemother* 2010; **16**: 78-86 [PMID: 20094751 DOI: 10.1007/s10156-009-0021-4]

14 **Yang EA**, Kang HM, Rhim JW, Kang JH, Lee KY. Early Corticosteroid Therapy for Mycoplasma pneumoniae Pneumonia Irrespective of Used Antibiotics in Children. *J Clin Med* 2019; **8**: 726 [PMID: 31121867 DOI: 10.3390/jcm8050726]

15 **Tong L**, Huang S, Zheng C, Zhang Y, Chen Z. Refractory Mycoplasma pneumoniae Pneumonia in Children: Early Recognition and Management. *J Clin Med* 2022; **11**: 2824 [PMID: 35628949 DOI: 10.3390/jcm11102824]

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