

A Brief Report of Infectious Profile of Childhood Pneumonia in a Sub-Urban Hospital

Bijal Shrivastava¹, Rashi Aryan², Sanjeev Ahuja³, Supraja Suresh⁴

¹Consultant, Department of Pediatrics, Dr. L.H. Hiranandani Hospital, Powai, Mumbai, Maharashtra, India

²Clinical Assistant, Department of Pediatrics, Dr. L.H. Hiranandani Hospital, Powai, Mumbai, Maharashtra, India

³Consultant, Department of Pediatrics, Dr. L.H. Hiranandani Hospital, Powai, Mumbai, Maharashtra, India

⁴Resident, Department of Pediatrics, Dr. L.H. Hiranandani Hospital, Powai, Mumbai, Maharashtra, India

Corresponding Author: Email: ²rashiaryan19@gmail.com

Abstract— Objective -To study the clinicopathological and radiological profile of lower respiratory tract infection in children less than 12 years of age in hospital setting. **Methods:** A cross sectional study was conducted in a suburban hospital for a period of one and a half years and 56 cases were admitted with LRTI of less than 12 years of age. History was obtained, examination was done and signs and symptoms were noted. All necessary investigations were done and managed as per standard guidelines. **Results:** Among 56 children, 50% had high grade fever, 60% of which had bacterial pneumonia. Cough was present in 57% of cases. At the time of admission, 92% of cases had respiratory distress. Blood culture was positive for *Strep. pneumoniae* in 8.9% of cases. Atypical pneumonia infection was seen in 84% of children less than 5 years of age. Higher antibiotic was used in 46.6% children. Duration of hospital stay of more than 7 days was seen in cases positive for *Streptococcus*, *Mycoplasma* and *Legionella* infection. **Conclusion:** Our study highlights the various types of infectious agents and their clinicopathological and radiological presentation in LRTI. A clear knowledge of the etiology and bacterial pathogens provides guidance for further management.

Keywords— Lower respiratory tract infection (LRTI), *Streptococcus pneumoniae*, Atypical pneumonia.

I. INTRODUCTION

Community acquired pneumonia (CAP) remains a common and serious illness. The Lancet Report, 2015 [1] showed that, worldwide, there were 5.9 million deaths of children under 5 years of age out of which 1.2million (20%) were contributed by India alone with under 5 mortality rate of 48 per 1000 live births [2]. Pneumonia contributes to one sixth of this mortality [3]. India alone has around 43 million pneumonia cases (23% of world total) and incidence of 0.37 episodes per child-year for clinical pneumonia [4].

The causes of CAP are many such as *S. pneumoniae*, *H. influenza*, viruses (Respiratory Syncytial Virus, Influenza virus) [5,6,7] and atypical pathogens like *Mycoplasma pneumoniae*, *Legionella pneumophila* and *Chlamydia pneumoniae* [5]. For pneumonia, it takes a few days to identify the causative micro-organism. In addition to the clinicopathological and radiological findings, physicians need reliable data on the relative prevalence of different etiological agents in the patients' area of residence so that the appropriate treatment can be rendered.

II. METHODS

This cross-sectional study was conducted in a suburban hospital in Mumbai, Maharashtra for a period of one and a half years from November, 2016 to May, 2018. The study was approved by the institutional ethics committee and protocol was followed as per ethical guidelines.

All children under the age of 12 years, admitted for lower respiratory tract infection were included in our study except those having co-morbidities such as neuromuscular diseases,

congenital heart and lung diseases[6]. Each child underwent a detailed history and clinical examination. For all cases, chest radiography and laboratory investigations (Hemogram, C-Reactive Protein, Atypical pneumonia panel and blood culture) were done.

Data was entered in Microsoft Excel and analyzed using Stata Version 15 (© StataCorp, College Station, Texas, USA). We calculated the means and standard deviations for the linear variables. The proportions between the groups were compared using the Chi square test or the Fischer's exact test (for low expected cell count). A p value of less than 0.05 was considered to be statistically significant.

III. RESULTS

Fifty six patients were enrolled in our study. Mean age group of children in our study was 3 years. At the time of admission, high grade fever (>103°F) was present in 28(50%) children. 24 (42%) children had fever lasting less than 3 days, 25 (44%) children had fever for 3 to 7 days and 7 (12%) children had fever for more than 7 days. High grade fever was seen in 60 % of children with bacterial pneumonia. Cough was present in 32 children (57%). Tachypnea was present in 30 children (53%). Respiratory distress in the form of retractions was present in 92% of children on admission.

White Blood Cell count was elevated (above 11,000/cumm) in 23.2% of children. C reactive protein was elevated in 42.8% of cases. Chest radiography was suggestive of bronchiolitis in 8.9%, lobar pneumonia in 41% and pleural effusion in 9% of cases.

Respiratory Syncytial Virus was found in 12.5%, Influenza A in 8.9%, *Chlamydia* in 1.7%, *Mycoplasma* in 1.7% and *Legionella pneumophila* in 8.9% of cases. Blood culture was

positive for *Streptococcus pneumoniae* in 5(8.9%) patients. Atypical pneumonia infection was seen in 84% of the children less than 5 years of age.

IV. DISCUSSION

High grade fever was seen in 60% of children with bacterial pneumonia as compared to children with atypical pneumonia who had low grade fever. These observations are consistent with the study which revealed patients with atypical pneumonia were less likely to have temperature greater than 37.8°F [7].

Respiratory distress was seen more in children diagnosed with RSV and bacterial infection than those with other viral pneumonia etiology (Figure 1). In case of atypical pneumonia, symptoms were gradual in onset, coinciding with a study done by Joseph. F. Police [8].

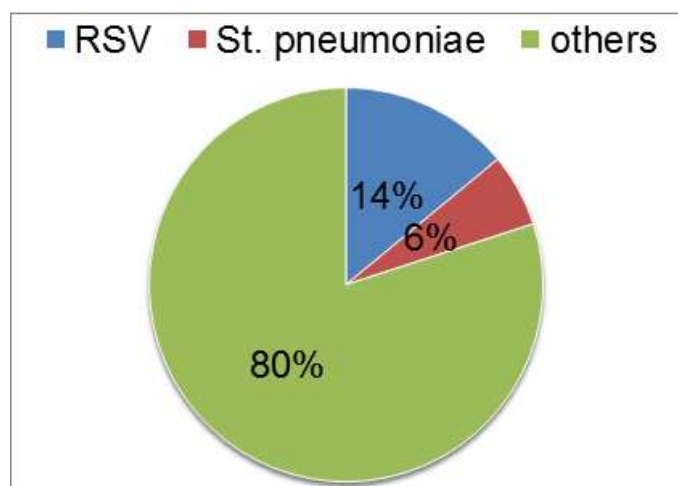


Fig. 1. Respiratory distress among different pathological agents

In our study, 5(8.9%) children had blood culture positive for *Streptococcus pneumoniae*. This was similar to a study done in Children’s Hospital, Philadelphia in 2012, that reported 2% bacteremia in their study with a predominance of *Streptococcus pneumoniae* growth in the blood culture [9].

The micro-organism which was most prevalent in our study was Respiratory Syncytial Virus in 12.5%, followed by Influenza A in 8.9%, Chlamydia in 1.7% and Mycoplasma in 1.7% and Legionella pneumophila in 8.9% of cases (Figure 2). This is comparable to the study done by Maitreyi R., Broor S., Kabra S., et al in New Delhi which showed RSV is the most common organism isolated in children with acute lower respiratory tract infection [10].

Atypical pneumonia infection was seen in 84% of children less than 5 years of age in our study. This was similar to a study done in Islamabad where among 206 children, 85% of them diagnosed with atypical pneumonia were less than 5 years of age [11].

In our study, 46.6% of the children required higher antibiotics during the course of hospital stay. Duration of hospital stay for treatment of infection was of 3 to 7 days in 78.5% of children and was more than 7 days in 10.7% of children. The duration of hospital admission for treatment of

the symptoms were longer than 7 days for bacterial, mycoplasma and legionella infection.

Bronchiolitis was seen more often in RSV, Influenza infection. Bronchopneumonia was seen in 40% of bacterial pneumonia infections. Similar result was reported in a study by Reynolds et al. in 2010 [12].

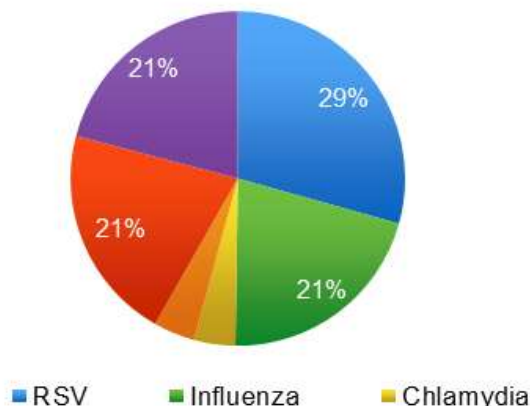


Fig. 2. Distribution of causative organisms in our study

V. CONCLUSION

Our study highlights the various types of infectious agents and their clinicopathological and radiological presentation in LRTI. A clear knowledge of the etiology and bacterial pathogens provides guidance for further management.

WHAT THIS STUDY ADDS?

Our study shows the clinicopathological and radiological presentations in the various etiological agents for LRTI in children less than 12 years of age in our hospital, which helps us not only to suspect the causative organism but also to initiate the appropriate antimicrobial treatment while awaiting the final report in future cases.

REFERENCES

- [1] Anuradha Mascarenhas. India missed 2015 child mortality target: Lancet report', *The Indian Express*. Available at: <http://indianexpress.com/article/india/india-others/india-missed-2015-child-mortality-target-says-lancet-report/>
- [2] UNICEF and WHO. (2006) Pneumonia: the forgotten killer of children. Available at: http://apps.who.int/iris/bitstream/10665/43640/1/9280640489_eng.pdf
- [3] Mortality rate, under-5 (per 1,000 live births) | Data [Internet]. Data.worldbank.org. 2018 [cited 6 September 2018]. Available from: <https://data.worldbank.org/indicator/sh.dyn.mort>
- [4] Thomas K. Global burden of pneumonia. *International Journal of Infectious Diseases*. 2016;45:1.
- [5] Dorairaj A, Sathyamoorthy Kopula S, Kumar K. Atypical Pneumonia - Screening in a Tertiary Care Centre. *Journal of Clinical Diagnosis and Research*. 2015;9(11):DC18-DC20.
- [6] Revised WHO Classification and Treatment of Pneumonia in Children at Health Facilities. Geneva: World Health Organization; 2014. ISBN: 978 92 4 150781 3.
- [7] Thom DH, Grayston JT, Wang SP. Chlamydia pneumoniae strain TWAR, Mycoplasma pneumoniae and viral infections in acute respiratory disease in a university student health clinic population. *Am J Epidemiol* 1990; 132:56.



- [8] JF. Plouffe. Importance of Atypical Pathogens of Community-Acquired Pneumonia. *Clinical Infectious Diseases*, Volume 31, Issue Supplement_2, 1 August 2000, Pages S35–S39
- [9] Shah S, Dugan M, Bell L, Grundmeier R, Florin T, Hines E. Blood Cultures in the Emergency Department Evaluation of Childhood Pneumonia. *The Journal of Emergency Medicine*. 2011;41(4):448.
- [10] Maitre RS, Broor S, Kabra SK, Ghosh M, P. Seth, Dar L, Prasad AK . Rapid detection of respiratory viruses by centrifugation enhanced cultures from children with acute lower respiratory tract infections. *Journal of Clinical Virology* 2000; 16.
- [11] Hassan M, Faiz N. Atypical Pneumonia in Children in Islamabad: Clinical Features And Response to Macrolides. *Annals of Pakistan Institute of Medical Sciences*. 2009;5(2):70-73.
- [12] Reynolds J, Mcdonald G, Alton H, Gordon S. Pneumonia in the immunocompetent patient. *The British Journal of Radiology*. 2010;83(996):998-1009.