

Recent Changes in the Clinical Symptomatology of Community Acquired Pneumonia in Children

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Received: November 2020

Accepted: December 2020

ABSTRACT

Background: Community-acquired pneumonia (CAP) is a lower respiratory tract infection occurring in a child who has not resided in a hospital or health care facility in the preceding 14 days. The present study was conducted to assess clinical profile of community-acquired pneumonia. **Methods:** 124 children age less than 12 years of both gender diagnosed with community acquired pneumonia were included. A detailed history and clinical examination was performed. Pneumonia severity was categorized based on the WHO classification. **Results:** Out of 124 children, boys were 70 and girls were 54. Common symptoms were fever in 114, cough in 120, rapid breathing in 82 and refusal to feed in 21, signs were crackles in 94, wheeze in 30, chest retraction in 102 and bronchial breath sound in 28. Clinical diagnosis was lobar pneumonia in 40, bronchopneumonia in 64 and pneumonia with complications in 20 cases. The association between disease severity and co-morbid conditions and immunization status was assessed and the results obtained were subjected to statistical analysis. The difference was significant ($P < 0.05$). **Conclusion:** Common symptoms were fever, cough, rapid breathing and refusal to feed, signs were crackles and wheeze.

Keywords: Cough, Fever, Pneumonia.

INTRODUCTION

Community-acquired pneumonia (CAP) is a lower respiratory tract infection occurring in a child who has not resided in a hospital or health care facility in the preceding 14 days.^[1] Vertical transmission of organisms from the maternal genital tract is the main route of entry of pathogens in the neonatal and early infancy period. The primary organisms responsible for pneumonia in the first three months of life are group B streptococci, gram-negative bacilli and occasionally *Listeria monocytogenes*.^[2] Between three weeks and three months of life, infants may present with an insidious afebrile pneumonitis syndrome caused by *Chlamydia trachomatis*. Overall, viruses are the most common causes of pneumonia in the first two years of life, accounting for up to 90% of pneumonias. The most commonly implicated viruses are respiratory syncytial virus, parainfluenza virus types 1, 2, and 3, influenza virus types A and B, adenovirus, rhinovirus, and less commonly, herpes simplex virus and enterovirus.^[3] Between the end of the last century and the beginning of the current one, significant changes occurred in the childhood CAP scenario. Firstly, the progressive implementation of bacterial conjugate vaccines, specifically the *Haemophilus influenzae* type b (Hib) vaccine and the pneumococcal conjugate vaccines (PCVs), the most frequent bacterial causative agents of CAP among children

under 5 so far.^[4] It has been recognized that the widespread use of Hib vaccine and PCV in countries with high child mortality has been associated with reductions in Hib and pneumococcal cases and deaths.^[8] Secondly, the successively widespread use of nucleic acid amplification techniques (PCRs) has impact on the estimation of the proportion of respiratory virus infections in childhood CAP.⁵ The present study was conducted to assess clinical profile of community-acquired pneumonia.

MATERIALS AND METHODS

The present study comprised of 124 children age less than 12 years of both gender diagnosed with community acquired pneumonia from September 2018 to December 2018 in a tertiary care centre in South India. Consent from parents of all patients was obtained.

Data such as name, age, gender etc. was recorded. A detailed history and clinical examination was performed. Pneumonia severity was categorized based on the WHO classification. All children underwent chest radiography. The chest radiographs were classified as alveolar, interstitial, and bronchopneumonia. The co-morbid conditions associated and immunization status was also noted. A blood sample was drawn by venipuncture for routine investigations. One to three ml blood was processed for bacterial culture using BACTEC/ALERT media. The bottles were incubated at 37°C for seven days and isolates were identified to species level by conventional biochemical and serological tests. A nasopharyngeal aspirate (NPA) specimen was obtained from all

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children using a sterile, disposable suction catheter and subjected to bacterial cultures. The association between disease severity and co-morbid conditions and immunization status was assessed and the results obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table 1: Distribution of patients

Total- 124		
Gender	Boys	Girls
Number	70	54

[Table 1] shows that out of 124 children, boys were 70 and girls were 54.

Table 2: Baseline characteristics

Characteristics	Number	P value
Severity		
Severe	80	0.01
Very severe	44	
Co- morbidity		
Malnutrition	62	0.02
Asthma	5	
Other	2	
Immunization status		
Immunized	52	0.12
Partially immunized	30	
Not immunized	42	

[Table 2] shows that severity found to be severe in 80 and very severe in 44, co- morbidities were malnutrition in 62, asthma in 5 and others in 2 cases. Immunization status was immunized in 52, partially immunized in 30 and not immunized in 42. The difference was significant (P< 0.05).

Table 3: Assessment of clinical features

Parameters	Variables	Number	P value
Symptoms	Fever	114	0.09
	Cough	120	
	Rapid breathing	82	
	Refusal to feed	21	
Signs	Crackles	94	0.01
	Wheezes	30	
	Chest retraction	102	
	Abnormal breath sound	28	
Clinical diagnosis	Lobar pneumonia	40	0.04
	Bronchopneumonia	64	
	Pneumonia with complications	20	

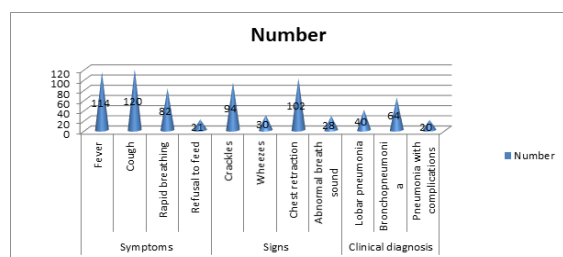


Figure 1: Assessment of clinical features

[Table 3, Figure 1] shows that common symptoms were fever in 114, cough in 120, rapid breathing in 82 and refusal to feed in 21, signs were crackles in 94, wheeze in 30, chest retraction in 102 and bronchial breath sound in 28. Clinical diagnosis was lobar pneumonia in 40, bronchopneumonia in 64 and pneumonia with complications in 20 cases. The difference was significant (P< 0.05).

DISCUSSION

Viruses are the most common cause of pneumonia in the first two years of life, accounting for up to 90% of pneumonia. The most commonly implicated viruses are respiratory syncytial virus, parainfluenza virus types 1, 2, and 3, influenza virus types A and B, adenovirus, rhinovirus, and less commonly, herpes simplex virus and enterovirus.^[6] With increasing age, the incidence of pneumonia decreases, but bacterial pathogens including *Streptococcus pneumoniae*, *Mycoplasma pneumoniae*, and *Chlamydia pneumoniae* become more frequent. In children up to 15 years of age, *Streptococcus pneumoniae* accounts for between 17% and 28% of all community-acquired pneumonia cases.^[7] The introduction of the pneumococcal protein-conjugate vaccines has led to a substantial reduction in *S pneumoniae* as a cause of invasive diseases, including pneumonia.^[8] While the overall rates of invasive pneumococcal infections are decreasing, the proportion of isolates that are penicillin or ceftriaxone resistant is increasing. This development should lead to a change in the empiric antibiotic choices for children presenting with pneumonia.^[9] The present study was conducted to assess clinical profile of community-acquired pneumonia.

In present study, out of 124 children, boys were 70 and girls were 54. Severity found to be severe in 80 and very severe in 44, co- morbidities were malnutrition in 62, asthma in 5 and others in 2 cases. Immunization status was immunized in 52, partially immunized in 30 and not immunized in 42. In a similar study, Shekhawat et al,^[10] enrolled 130 children. NPA and blood cultures yielded bacteria in only 42 (32.3%) and 29 (22.3%) children respectively. The most common organism isolated on blood culture was *Staphylococcus aureus* (10%) followed by *Streptococcus pneumoniae* (3.1%). The most common organism isolated on nasopharyngeal aspirate culture was *Streptococcus pneumoniae* (18.5%), followed by *Staphylococcus aureus*. Malnutrition (50%) was the most common co-morbidity associated with CAP followed by asthma (4%).

We found that common symptoms were fever in 114, cough in 120, rapid breathing in 82 and refusal to feed in 21, signs were crackles in 94, wheeze in 30, chest retraction in 102 and bronchial breath

sound in 28. Clinical diagnosis was lobar pneumonia in 40, bronchopneumonia in 64 and pneumonia with complications in 20 cases. Carvalho et al,^[11] found that hypoxemia (oxygen saturation $\leq 96\%$) and increased work of breathing are signs most associated with community-acquired pneumonia. Wheezing detected on physical examination independently and the negative predictive value (95% confidence interval) of serum procalcitonin predicts viral infection.

In a study conducted in three rural hospitals in Rwanda between May 2011 and April 2012, 147 cases were analyzed and 58% had radiologist-diagnosed pneumonia. Oxygen saturation was the best clinical predictor; its area under the receiver operating characteristic (ROC) curve (0.675 [95% CI: 0.581--0.769]; $p = 0.001$) was higher than that of the respiratory rate (0.528 [95% CI: 0.428-0.627]; $p = 0.588$).^[12]

CONCLUSION

Author found that common symptoms were fever, cough, rapid breathing and refusal to feed. Common signs were crackles and wheeze. The association between disease severity and co-morbid conditions and immunization status was assessed and the results obtained were statistically significant. ($p < 0.05$)

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How to cite this article: Deepa SN. Recent Changes in the Clinical Symptomatology of Community Acquired Pneumonia in Children. *Ann. Int. Med. Den. Res.* 2021; 7(2):PE05-PE07.

Source of Support: Nil, **Conflict of Interest:** None declared