Medical Science

Treatment of paediatric bronchopneumonia: a case report

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ABSTRACT

Pneumonia is a complex pulmonary disease caused by inflammation of lower respiratory tract frequently affecting infants, young children and elderly people. Bronchopneumonia is the commonly seen presentation of pneumonia occurring mainly in paediatric population. This disease may be life-threatening if not treated promptly. Early signs and symptoms include productive cough, fever with chills, difficulty in breathing, tachypnea and fatigue. Most common causes are Streptococcus pneumonia, influenza, respiratory syncytial virus (RSV), and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The primary goal is to treat the underlying infection which will resolve the disease. Some form of pneumonia can be prevented prophylactically by taking appropriate vaccines. In this case report, we aim at early diagnosis and treatment of paediatric bronchopneumonia by reviewing its clinical presentation. This is a case of 15 months old boy with bronchopneumonia, who responded well with intravenous antibiotics and recovered within 10 days.

Keywords: pneumonia, bronchopneumonia, paediatric

1. INTRODUCTION

Bronchopneumonia is caused by various pathogens resulting in respiratory tract infection. The presentation of disease depends on the disease severity, host defences and related complications. Bronchopneumonia may present with a productive cough, dyspnea, fever, rigors and malaise (Paks & Knipe, 2020). Risk factors for pneumonia include inadequate breastfeeds, low birth weight (LBW), poor nutrition, indoor air pollution, overpopulation and missed measles vaccine. The World Health Organization (WHO) classify pneumonia into two categories; pneumonia with tachypnea and/or chest indrawing, treated at home with oral antibiotics, and severe pneumonia with any general warning signs, to be hospitalized (WHO, 2014; WHO, 2021). If the pneumonia develops outside the hospital it is referred to as community-acquired pneumonia (CAP) and the pneumonia that develops after 48 hours post hospitalization is known as nosocomial or hospital acquired pneumonia (HAP) (Pahal et al., 2021). Pneumonia has a higher risk of mortality among children below 5 years. Pneumonia has an approximated global incidence of

0.37% per year for every child and India has an incidence of 36% among South Asian population (Mathew et al., 2011; Gothankar et al., 2018).

2. CASE REPORT

A 15 months old boy presented with complaints of cough, cold, fever and loss of appetite for a duration of 5 days. There was a previous history of cold and fever 1 week ago, which got settled after treating with Paracetamol 125mg/5ml and Amoxicillin 125mg/5ml at home. The child was afebrile for a week followed by recurrence of fever. Now he was brought to the out-patient department with high fever, productive cough with tachypnea, decreased intake and difficulty in breathing. His physical examination revealed chest wall indrawing with a temperature of 101.6°F, pulse rate (PR) of 110 beats/min, respiration rate (RR) of 56/min and SpO2 (peripheral capillary oxygen saturation) of 94% at room air. The patient was dyspneic and irritated. On auscultation, bilateral crepitations and occasional wheeze was heard. He weighed 8kg with a height of 82cm. He was a full term caesarean section baby with a birth weight of 2.8kg. There was no other past history of respiratory tract infections or lung infections. There was no history of contact with COVID-19 case or recent travel. The child had attained all developmental milestones and was immunized completely. He was advised for hospitalization and started treatment on intravenous antibiotics along with nebulization. Investigations were done including complete blood count (CBC) with peripheral smear study, Chest X-Ray (CXR), C-Reactive Protein (CRP) and urine routine analysis. Real time reverse transcriptase-polymerase chain reaction (RT-PCR) test was also done to rule out COVID-19 infection. The chest X-Ray detected infiltration on the right pericardiac region (Figure 1). The CBC report showed platelet levels lower than normal and other parameters within the range (Table 1). Peripheral smear study was insignificant (Table 2). C-Reactive protein and urine routine analysis reports are depicted in (Table 3 & 4).

Figure 1: Chest X-Ray (AP view)

Table 1: Complete Blood Count Test

Complete Blood Count		
Test Description	**Observed Value**	**Biological Reference Value**
Hb%	11.4 g/dl	11.1 – 14.1 g/dl
Total WBC Count	8080 cells/cumm	6000 – 16,000 cells/cumm

Neutrophils	44.5%	15 – 45%
Lymphocytes	53.1%	44 – 74%
Eosinophils	0.0%	0 – 6%
Monocytes	2.3%	0 – 2.4%
Basophils	0.1%	0 – 2%
RBC count	4.76 millions/cumm	3.9 – 5.1 millions/cumm
Haematocrit (PCV)	35%	34 – 38%
Platelets count	1.70 Lakhs/cumm	2.0 – 5.5 Lakh/cumm
MCV	73.5 fl	72 – 84 fl
MCH	24 pg	25 – 29 pg
MCHC	32.7%	32 – 36%

Table 2: Peripheral Smear Study

Peripheral Smear Study	
RBCs	Predominantly normocytic normochromic
WBCs	Normal in number, morphology and distribution
Platelets	Adequate
	No haemoparasites seen
	No immature cells seen
Impression	Normal smear study

Table 3: Test for C-Reactive Protein

C-Reactive Protein		
Test Description	**Observed Value**	**Biological Reference Value**
C-Reactive Protein	0.4 mg/dl	Negative - Less than 0.6 mg/dl

Table 4: Urine Routine Analysis Test

Urine Routine Analysis		
Test Description	**Observed Value**	**Biological Reference Value**
Colour	Pale yellow	Straw, pale to dark yellow
Appearance	Clear	
PH	7.0	4.6 – 8.0
Proteins	Absent	NIL <=10mg/dl
Sugar (R)	Absent	NIL/Absent
Microscopy Examination		
RBCs/hpf	Absent	NIL/Absent/0-3/hpf
Pus cells/hpf	0 – 1	NIL/Absent/0-5/hpf
Epi.cells/hpf	Occasional	NIL/Absent/0-5/hpf
Casts & crystals	Absent	NIL/Absent
Others	Absent	NIL/Absent

The child was initiated on injection Ceftriaxone 300mg intravenous twice a day, Salbutamol nebulization along with 6 litres of oxygen every 4th hourly, Cetirizine syrup 5mg/5ml at night and Paracetamol syrup 125mg/5ml SOS. The vitals were continuously monitored. Recurrence of fever was there till the 3rd day. There was also a drop in oxygen saturation to 88% at room air during the night on the 1st day. The child recovered slowly and became active with improvement in appetite. No fever was recorded after 3rd day evening. Gradual improvement in chest indrawing was seen. On the 5th day, the child showed improvement clinically with no fever and no tachypnea.

3. DISCUSSION

Pneumonia is the largest global burden of childhood mortality worldwide. It is also a frequent reason for hospital admissions in children. The clinical presentation, etiology and outcome of bronchopneumonia in children differ from that of other population. The patient was diagnosed based on the clinical examination and chest radiograph (Nathan et al., 2020). The WHO has developed pneumonia classification and management guidelines to identify simple signs and appropriate management actions. According to the revised WHO recommendations, pneumonia with tachypnea and no chest indrawing or any other warning signs should be treated with oral Amoxicillin 80mg/kg/day for five days. Pneumonia with tachypnea and who fail to first-line Amoxicillin should be started on appropriate second-line treatment. Ceftriaxone can be used as a second-line treatment in severe pneumonia (WHO, 2014). To summarize the current pharmaco-therapeutic options for paediatric pneumonia, the neonates should receive Ampicillin alongwith an aminoglycoside or third-generation cephalosporin. Ceftriaxone is avoided in neonates for risk of kernicterus. The British Thoracic Society (BTS) and Infectious Diseases Society of America (IDSA) pneumonia guidelines recommended an additional antibiotic coverage with macrolides like Erythromycin or Clarithromycin for atypical pneumonia commonly seen in infants 1-3 months age. For children 3 months and above, high-dose oral Amoxicillin is recommended. In children 5 years and above, macrolides are recommended first-line therapy. Intravenous antibiotics are recommended for children with no pneumococcal vaccination.

The health care professional should be familiar with the warning signs of pneumonia such as hypoxemia and choose the appropriate treatment. Laboratory investigations should be done for children presenting with toxic features. Chest radiograph is useful in the detection of pneumonia. The parents should be educated of the general warning signs of pneumonia which include decreased intake, vomiting and altered consciousness. Identifying these signs will help in the treatment outcome. Research has showed decrease in number of hospitalization and fatalities with early identification and management of pneumonia. Routine vaccination have shown significantly reduced mortality in children (Singhi et al., 1994; Ebeledike & Ahmad, 2021; Korppi, 2021).

4. CONCLUSION

Our case report emphasizes on early diagnosis and treatment of bronchopneumonia. Understanding the risk factors and the disease itself will help to reduce the higher mortality associated with pneumonia. Creating awareness to take preventive measures and identifying the signs will help in the choice of antibiotics and reduce hospitalizations. Our primary objective is to improve the child's natural defences by promoting proper nutrition with exclusive breastfeeds until 6 months. Improving living conditions and encouraging good personal hygiene reduces the chances of getting pneumonia. Promotion of vaccines will be helpful in prevention of pneumonia.

Author contribution

Both the authors made substantial contributions in drafting, revising and final approval of this manuscript version to be published and agree to be accountable for all aspects of the work.

Informed consent

Written informed consent was obtained from the parent of the child.

Conflict of interests

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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