ORIGINAL RESEARCH PAPER

Paediatric Medicine

PULMONARY RADIOGRAPHIC FINDINGS IN PNEUMONIA TO PREDICT OUTCOME IN UNDER 2 CHILDREN

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ABSTRACT

Background: Pneumonia defined as an Inflammation of lung parenchyma , is the leading cause of childhood mortality worldwide. Chest radiography is an important tool to diagnose pneumonia. Chest radiography findings predict outcome of children with suspected case of pneumonia. **Materials and Methods:** In this prospective randomised controlled study, 50 patients of pneumonia admitted in Department of Pediatrics at Nalanda Medical college ,Patna ,Bihar from October 2021 to March 2022 were included on the basis of pulmonary radiographic finding .Chest x ray was taken within 48 hours of admission. And outcome was analysed. **Results:** 8%(4) required respiratory support out of which (6%) 3 patient required CPAP and 2% (1) patient required mechanical ventilation. **Conclusion:** These results highlight the potential benefit of expanding global access to diagnostic radiology services and to incorporating radiographic findings in the risk stratification of children with suspected pneumonia.

Introduction:

Pneumonia defined as an inflammation of lung parenchyma , is the leading cause of childhood mortality worldwide. Pneumonia accounts for 14% of all death of children under 5 year old, killing 740180 children in 2019[1] and causes one-third (33%) of all under 5 deaths from infection[2]. Incidence of pneumonia in children younger than 5 year in India was 657 cases per 1000 childre in 2000 and 403 cases per 1000 children in 2015.

The estimated national pneumonia case fatality rate in 2015 was 0.38%. The estimated number of pneumonia cases in HIV –uninfected children was 7.3 million in Bihar[3]

Bronchopneumonia is acute inflammation of bronchi accompanied by inflamed patches in the nearby lobules of lungs. Lobar pneumonia is characterized by inflammatory exudates within the intraalveolar space resulting in consolidation affecting a lobe of a lung. Interstitial pneumonia is inflammation in the interstitial space. Diffuse pneumonia is more severe form . These are usually consistent with multilobar diffuse infiltrates and adenopathy. Complications of pneumonia are Pleural Effusion, Empyema, pneumothorax and ARDS.

An infiltrate on chest radiograph (PA and Lateral view) supports the diagnosis of pneumonia. Viral pneumonia usually characterized by hyperinflation with bilateral interstitial infiltrates and peribronchial cuffing. Confluent Lobar consolidation is typically seen with Pneumococcal pneumonia. Group A streptococcus LRTI typically results in more diffuse lung involvement with interstitial pneumonia. S. aureus pneumonia manifests as confluent bronchopneumonia which is often unilateral results in pneumatoceles, empyema and at times bronchopulmonary fistula. Repeat CXR are not required for proof of cure for patient with uncomplicated pneumonia. Average duration of antibiotic is around 7-10 days depending upon etiology.

The aim of our study is to see the relationship of value of pulmonary radiographic finding to predict outcome in pneumonia.

Material And Methods

This prospective hospital based study was carried out on patients of Department of Pediatrics and Neonatology at Nalanda Medical college ,Patna ,Bihar from October 2021 to March 2022. A total 50 children suffering from pneumonia admitted in pediatric ICU.

Study Design: Prospective open label observational study

Study Location: This was a tertiary care teaching hospital based study done in Department of Pediatrics and Neonatology at Nalanda Medical college ,Patna ,Bihar .

Study Duration: October 2021 to March 2022.
Sample size: 50 patients.

Subjects & selection method: A total of 50 children suffering from pneumonia admitted in pediatric ICU were included on the basis of pulmonary radiographic finding. Chest radiograph were reviewed by two pediatrician to generate a consensus interpretation using standardized WHO criteria.
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Inclusion criteria:

1. 1 month to 24 months presented with cough and respiratory distress.

Exclusion criteria:

1. Structural defect like cleft lip , cleft palate, tracheoesophageal fistula.
2. GERD
3. Cardiovascular problem
4. Immunodeficiency state
5. Asthma and wheezing child

Procedure methodology

A total of 50 children suffering from pneumonia admitted in pediatric ICU were included on the basis of pulmonary radiographic finding. Chest radiograph were reviewed by two pediatrician to generate a consensus interpretation using standardized WHO criteria.

Chest x ray was taken within 48 hours of admission. And outcome was analysed.

Treatment failure
1. Persistent retractions,
2. O2 saturation <80% @ room air ,
3. Requirement for CPAP/HHHFNC or Mechanical ventilation,
4. Or death.

Other factors which were taken into account are duration of hospital stay , requirement for antibiotics, number of days when respiratory support was needed, and also breastfeeding and birth weight.

Statistical analysis
Data was analyzed using SPSS version 20 (SPSS Inc., Chicago, IL).

Results
From October 2021 to March 2022, we enrolled 50 children and evaluated their chest radiographs.
Median age was 5.5 months. 40% were male and 60% were female . Median duration of stay was 7 days . Median duration of antibiotic was 10 days . 80% were immunized as per National Immunisation Schedule and 20% were of incomplete immunization. 8%(4) required respiratory support out of which (6%) 3 patient required CPAP and 2% (1) patient required mechanical ventilation.10%(5) child with pneumonia were associated with SAM. 8%(4) child with pneumonia were associated with tuberculosis.

Table no 1. Shows Chest radiograph classification

	TOTAL	EARLY RESPONDER	TREATMENT FAILURE
Broncho pneumonia	20 (40%)	20	0
Lobar pneumonia	10 (20%)	10	0
Pleural Effusion	3 (6%)	2	1
Empyema	2 (4%)	1	1
Pneumothorax	2(4%)	2	0
Diffuse	7 (14%)	5	2
No significant pathology	6(12%)	6	0

DISCUSSION
From this study we concluded that prevalence of bronchopneumonia (40%) is higher compared to lobar pneumonia 10 (20%). Prevalence of diffuse infiltration was higher in children with tuberculosis. Bronchopneumonia were more frequent among chidren with moderate to severe malnutrition. 4 children (8%) underwent treatment failure i.e. not responding within 48 hours. Children with diffuse infiltration required more days of respiratory support and longer length of stay compared to other. Lobar pneumonia required longer duration of antibiotics.

Risk factors like low birth weight , lack of breast feeding, and incomplete immunization were more prone to pneumonia.

According to Mathew S Kelly et al (4) 21% patient were SAM with pneumonia and in our study 10% patient were SAM with pneumonia. In Mathew S Kelly et al study(4) 11% patient required CPAP and in our study 6% patient required CPAP. In Mathew S Kelly et al study (4) 2% required mechanical ventilation in our study 2% required mechanical ventilation. In Mathew S Kelly et al study 4.8% patient died and in our study none of the patient died.

CONCLUSION
These results highlight the potential benefit of expanding global access to diagnostic radiology services and to incorporating radiographic findings in the risk stratification of children with suspected pneumonia.

REFERENCES
[1]. WHO Monograph, 2019.
[2]. WHO and Maternal and Child epidemiology Estimation Group estimates ,2015
[3]. The Lancet , Child and Adolescent Health Vol 4, issue 9, P678-687, SEP 01 ,2020.
[4]. Mathew S Kelly et al study (4). Infectious DiseseJ. 2016 March ; 35(3): 257-262 doi : 10.1097 /NF