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A STUDY ON NON RESOLVING PNEUMONIA: ETIOLOGY AND OUTCOME

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Abstract: Aims and objective: The study was aimed to identify the etiology of non resolving pneumonia in children. **Methods:** Twenty two cases with non resolving pneumonia were investigated and analyzed to find out the underlying cause. **Results:** Out of 22 cases, most common cause was persistence of bacterial infections which was found in about 1/3rd (7) of the patients and 22.7% (5) of the cases had pulmonary tuberculosis. Foreign body aspiration (3), Gastroesophageal reflux (2), congenital heart disease (1) and pulmonary malformation (1) were less common causes found in the study. In two cases cause could not be made out. **Conclusion:** The most common underlying causes of non resolving pneumonia were incomplete clearance of bacterial infection and undiagnosed pulmonary tuberculosis which should alert the treating clinician while treating a patient with pneumonia.

Keywords: Non resolving pneumonia; Tuberculosis, Foreign body aspiration, Gastro esophageal reflux.

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INTRODUCTION

Non resolving pneumonia is defined as the persistence of symptoms and radiographic abnormalities in a child with lower respiratory tract infection (LRTI) for more than a month despite a course of antibiotic therapy for 10 days.^{2,3,4} Though some investigators have accepted this definition, some authors still prefer to use a cut-off of longer duration.⁵ Identifying the cause of non resolving pneumonia in children is always a challenge to the pediatricians and respiratory physicians. Not many studies have reported on the etiology and the course of non resolving pneumonia in children. Moreover, most studies available in literature have described persistent and recurrent pneumonia as a single entity.^{6,7} Therefore there is a need for clarity on non resolving pneumonia in children, hence the present study. Previously a study on non resolving pneumonia underlying cause and outcome was done from JIPMER in 2009 which was published in IJP April 2009. The present study was focused at identifying the causes and the contributing factors of non resolving pneumonia in children.

MATERIALS AND METHODS:

This prospective study was conducted in the department of pediatrics and pulmonology, FIMS, Kadapa. Non resolving pneumonia cases (2 mo - 12 yr) who came to the hospital between August 2012 and July 2013 were included in the present study. Non resolving pneumonia was defined as features of lower respiratory tract infection with radiological evidence of infiltrates or consolidation in the lungs persisting for 30 days or more, despite receiving antibiotics for a minimum period of 10 days.

A Proforma was used to collect the data. Special attention for history was given to (1) age and sex, (2) duration of symptoms and treatment given, (3) history of Tuberculosis contact (4) immunization status and (5) history of foreign body aspiration.

Evaluation including complete hemogram, blood culture and sensitivity and ELISA for human immunodeficiency virus (HIV) infection were done. Mantoux test was done for tuberculin sensitivity and Gastric aspirate for young children and sputum for older children were sent for acid fast staining on three consecutive days. Gene expert test for Rapid Diagnosis of tuberculosis was done. Chest x-ray PA view in older children and AP view in younger children and a lateral view were taken, to document the presence of infiltrates or consolidation. Computed tomogram of thorax with contrast was done in few cases. Bronchoscopy and bronchoalveolar lavage (BAL) were done in selected cases by the pulmonologist. BAL fluid was subjected to microbiological and cytological assessment. Ultrasonography of thorax was performed in suspected cases of pleural effusion and pleural aspirate was obtained and examined for bacteria, adenosine deaminase, AFB stain and cytology. Milk scan was performed in suspected cases of gastroesophageal reflux disease. Chest radiograph and computed

tomography images were interpreted by three independent observers. At the end of the study, analysis was done to find out the etiology for non resolving pneumonia.

RESULTS AND DISCUSSION:

The study group consisted of 22 cases. The age ranged from 2 months to 12 years with a mean age of 4 yrs at the time of presentation. Most of the cases were malnourished with 16 patients (72.7%) falling under fifth centile. History of contact with tuberculosis patient was present in 4 (18%). BCG scar was absent in 7 (31.8%) of cases. Four cases (18%) had positive tuberculin sensitivity by Mantoux test. Gastric aspirate/ sputum for acid fast bacilli (AFB) were positive in three out of 22 patients (13.6%). One patient tested positive for human immunodeficiency virus (HIV).

In seven cases bacterial growth was found from blood culture, BAL fluid, sputum. The isolated bacteria were Klebsiella, Enterobacter, Acinetobacter, Pseudomonas, Hemophilus influenza B.

Milk scan was performed in six out of 22 cases presenting with a history of regurgitation of feeds. It was positive for gastroesophageal reflux (GER) in two cases (9%). Echocardiography was performed in 9 cases with a clinical suspicion of heart disease. It was found to be abnormal in one case (4.5%). The abnormality found was ASD with pulmonary hypertension.

The findings in the chest roentgenogram and the computed tomography (CT) of the thorax are hilar adenopathy was present in the chest radiographs of three cases (13.6%) whereas in CT-thorax mediastinal nodes, were found in one additional patient. Congenital malformations were found in one case (4.5%), which was congenital cystic adenomatoid malformation (CCAM) of right lung. Immunological studies were done for four cases. One patient was positive for HIV. The underlying causes of non resolving pneumonia could be found in 20 cases (90.9%). Table 1 shows the etiological factors in descending order of frequency.

Table 1. Etiologic factors in cases with persistent pneumonia

	Number of cases	Percentage
Gram negative bacterial infections	7	31.80
pulmonary Tuberculosis	5	22.70
Foreign Body Aspiration	3	13.60
GERD	2	9.09
Congenital malformation	1	4.50
congenital heart disease	1	4.50
HIV	1	4.50

Unknown etiology	2	9.09
Total	22	100

On follow up 18 cases (81.8%) showed improvement after appropriate treatment out of which 7 (31%) had Gram negative bacterial infections, 5 (22.7%) had pulmonary tuberculosis, 3 (13.6%) had Foreign Body which were removed during the diagnostic Bronchoscopy, 2 (9.09%) had GERD; one (4.5%) had HIV with tuberculosis; one (4.5%) had congenital heart disease, another one (4.5%) had congenital malformation

Non resolving pneumonia usually results from incomplete antibiotic therapy, undiagnosed pulmonary Tuberculosis, deficiencies in the local pulmonary or systemic host defenses or from underlying disorders that modify the lung defenses.¹⁰

The underlying factors associated with non resolving pneumonia can be broadly classified into following categories: ⁵⁻¹¹ (1) Resistant or highly virulent organisms; atypical organisms (2) Inadequate antibiotic therapy (3) Congenital malformations of the upper or the lower respiratory tract, thoracic cage, vessels and cardiovascular system (4) Recurrent aspirations (5) Defects in the clearance of airway secretions especially cystic fibrosis and other ciliary dyskinesias (6) Disorders of systemic or local immunity.

CONCLUSION:

Persistent pneumonia is a major challenge for the clinicians. Common causes found in the present study were Gram negative bacterial infection, pulmonary Tuberculosis foreign body and aspiration due to gastro esophageal reflux disease.

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