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Research Article

### PERSISTENT AND RECURRENT PNEUMONIA IN SERVICES HOSPITAL LAHORE: ETIOLOGY AND CLINICAL PROFILE

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**Article Received:** October 2020**Accepted:** November 2020**Published:** December 2020**Abstract:**

**Introduction:** Recurrent and persistent pneumonia has become a challenge for doctors. The purpose of this study was to assess the clinical profile and determine the causes of recurrent and persistent pneumonia in children admitted to Services Hospital.

**Methods:** The paper presents a retrospective analysis of the medical records of children meeting the criteria of recurrent and persistent pneumonia. The analyzed patients were admitted to the Pediatric department. This is a retrospective study conducted at the Pediatric department of Services Hospital, Lahore for one-year duration from August 2019 to August 2020.

**Results:** During the entire study period, 30 patients were analyzed. Twenty-four patients presented with recurrent pneumonia [80%] and six patients with persistent pneumonia [20%] during the study. After analyzing the clinical profile, the following causes were identified: pulmonary tuberculosis [23.3%], congenital heart disease [13.3%], cystic fibrosis [16.6%], aspiration syndrome [13.3%], bronchial asthma [10%], immune disorders [10%], bronchiectasis [6.6%], congenital pulmonary agenesis [3.3%], unknown cause [3.3%].

**Conclusion:** Among patients admitted to the sHospital, the most common cause of recurrent and / or persistent pneumonia was pulmonary tuberculosis, followed by congenital heart disease and cystic fibrosis.

**Key words:** persistent pneumonia, recurrent pneumonia, cystic fibrosis, pulmonary tuberculosis.

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**INTRODUCTION:**

Pneumonia is one of the leading causes of under-five mortality in Bangladesh. Recurrent and persistent pneumonia has become a challenge for our children. A small proportion of pneumonia becomes recurrent and permanent. Recurrent pneumonia is defined as 2 or more episodes of pneumonia over 1 year, or more than 3 episodes of pneumonia at any one time with radiographic clearance between episodes<sup>3</sup>. According to this definition, recurrent pneumonia occurs in 6.4% - 9% of all children with pneumonia. Persistent pneumonia is defined as symptoms of a lower respiratory tract infection [i.e., cough, tachypnea and fever with or without chest recession] with radiographic signs of infiltration or consolidation in the lungs for 30 days or more despite taking antibiotics for at least 10 days. There is limited data on the factors that may predispose patients to recurrence or persistence of pneumonia. The aim of the study is to describe the predisposing causes of recurrent and persistent pneumonia.

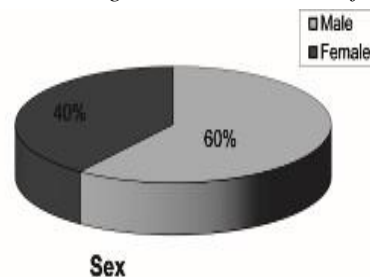
**MATERIALS AND METHODS:**

This is a retrospective study conducted at the Pediatric department of Services Hospital, Lahore for one-year duration from August 2019 to August 2020. We retrospectively analyzed cases from 2 months to 12 years of age that were admitted and treated at our unit during the study period. Patients were admitted directly or referred from other departments, clinics or hospitals. Patients were included according to the definition of recurrent and persistent pneumonia. The inclusion criteria were radiographic evidence of recurrent and persistent pneumonia. However, patients with critical medical conditions such as severe respiratory failure were excluded from the study. The diagnosis was made on the basis of the history, clinical features, and relevant research. Data was collected for all patients on demographic profile, pneumonia episodes, and relevant tests including chest X-ray, chest CT scan. The data comes from the registry of the department of pediatric pulmonology. The collected data was analyzed by SPSS version 16.

**RESULTS:**

During one year, we analyzed 30 patients meeting the criteria for recurrent or persistent pneumonia. Their ages ranged from 2 months to 12 years. The mean age of presentation was  $3.0 \pm 2.8$  years. Four children [13.3%] had onset of symptoms before 6 months of age, 10 [33.3%] from 6 months to 2 years, 13 [43.3%] from 2 to 5 years, and 3 [10.0%] after 5 years of age. The patients were 18 [60%] men and 12 [40%] women. Among the symptoms presented, cough was evident in all cases [100%], then dyspnea, fever, wheezing and no development were documented. Physical examination revealed accelerated breathing, smacking, chest deformity, abnormal sound during auscultation, rickets, and malnutrition [moderate / severe] [Table 2]. Most of the children were considered malnourished [80%]. In all cases, the chest radiograph showed signs of pneumonia. Chest CT was performed in 17 cases with bronchiectasis in 3 [10%] cases, collapse in 4 [13.3%] cases, pneumonia in 8 [26.6%] cases, lung agenesis in 1 [3] cases. , 3%] cases, congenital lobar emphysema in 1 [3.3%] cases. We had 24 patients with recurrent pneumonia [80%] and 6 patients with persistent pneumonia [20%]. Among the etiological factors, gastroesophageal reflux disease [GERD] was diagnosed in 2 [6.6%] patients who were clinically suspected and with the use of barium swallow, esophageal pH manometry. 2 [6.6%] patients had a history of defined foreign body aspiration [FB]. This story was confirmed by bronchoscopic foreign body removal. Three patients [10%] had immunodeficiency disorders. Congenital heart disease was confirmed by echocardiography in 5 patients [16.6%]. Of these patients, 2 had ventricular septal defect [VSD], 1 had Patent Ductus arteriosus [PDA], 1 had great artery transposition [TGA], and one had complex congenital heart disease. Three patients [10%] had bronchial asthma. Cystic fibrosis was diagnosed in 4 [13.3%] patients. Pulmonary tuberculosis was diagnosed in 7 [23.3%] patients; one patient [3.3%] had congenital airway defects in the form of congenital agenesis of the right lung. Two [6.6%] patients had bronchiectasis. No cause could be identified in 1 child.

**Fig.-1:** Pie chart showing the sex distribution of the studied patients.



**Table-I Types of Pneumonia [n=30]**

Patients No [%]	Recurrent Pneumonia	Persistent Pneumonia
Number	24	6
Percentage	80%	20%

**Table II Clinical Profile and radiologic Profile [n=30]**

Characteristics	Number	Percentage
Presenting feature		
• Cough	30	100%
• Breathlessness	19	63.3%
• Fever	26	86.6%
• Wheeze	14	46.6%
• Failure to Thrive	17	56.6%
Physical finding		
• Tachypnea	21	70%
• Clubbing	6	20%
• Chest deformity	12	40%
• Abnormal sound on auscultation	26	86.6%
• Rickets	1	3.3%
• Malnutrition[moderate/ Severe]	24	80%
Chest Radiograph		
• Collapse	5	16.6%
• Consolidation	7	23.3%
• Bronchopneumonia	8	26.6%
• Bronchiectasis	5	16.6%
• Hyperinflation	4	13.3%
• Agenesis of lung	1	3.3%
CT scan of chest •		
• Bronchiectasis	3	10%
• Collapse	4	13.3%
• Pneumonia	8	26.6%
• Agenesis of lung	1	3.3%
• Congenital Lobar Emphysema	1	3.3%

**Table-III Etiology of recurrent/persistent pneumonia [n=30]**

Etiology	Number	Percentage
GERD	2	6.6%
FB aspiration	2	6.6%
Cystic fibrosis	4	13.3%
Immune deficiency	3	10%
Bronchial asthma	3	10%
Pulmonary TB	7	23.3%
Congenital Lung Agnesis	1	3.3%
Bronchiectasis	2	6.6%
Congenital heart disease	5	16.6%
Unknown cause	1	3.3%

**DISCUSSION:**

There are several studies on recurrent and / or persistent pneumonia around the world. Most of the studies have highlighted the causes. In this study, 80% of patients had relapses and 20% of patients had persistent pneumonia, the most common cause being pulmonary tuberculosis followed by congenital heart disease, cystic fibrosis, immunodeficiency, bronchiectasis, and congenital pulmonary agenesis. The current results and literature review revealed that the causes of recurrent / persistent pneumonia in children from different geographic areas are similar but with different incidence. The children had an almost similar onset of symptoms at an early age. Saad et al. found that the most common cause was aspiration syndrome [17.7%], followed by pulmonary tuberculosis [14.0%] and congenital heart disease [11.5%]. Owayed et al. Found that the most common causes were aspiration syndrome [48%], immune disorders [10%], congenital heart defects [9%], and asthma [9%]. In our study, pulmonary tuberculosis was diagnosed in 7 [23.3%] patients; 2 with recurrent pneumonia and 5 with persistent pneumonia. The Mantoux test was positive in all cases. Acid-resistant rods were found in ZN staining of gastric lavage in 4 patients. Gene X-pert was positive for MTB in 5 patients sensitive to rifampicin. The remaining 2 patients were diagnosed on the basis of strong clinical and radiological results as well as positive contact history with known adult tuberculosis cases. These patients did not respond to the usual antibiotics and achieved clinical improvement with anti-tuberculosis treatment. The current study found that 4 cases had cystic fibrosis, diagnosed with a positive chloride sweat test. Patients were diagnosed according to their history of pneumonia, lack of normal development, parental relationship and physical symptoms, and a positive chloride sweat test [conventional bag method]. Two patients had *Pseudomonas aeruginosa* in the culture of airway

secretions and the patients responded well to treatment against *Pseudomonas*, which is also very indicative of cystic fibrosis. Although the incidence of cystic fibrosis in our country is rare, we have diagnosed 3 cases with respiratory symptoms and 1 case with respiratory symptoms related to malabsorption. Congenital heart disease is one of the important causes of recurrent / persistent pneumonia in children. Congenital cyanotic heart disease with left-to-right leaks increases blood flow to the lungs, increases the workload of the heart, and increases the susceptibility to respiratory infections. Cyanotic congenital heart defects with increased blood flow to the lungs also cause recurrent and persistent pneumonia. A review of the literature revealed that congenital heart disease accounts for 1.2–25.4% of cases. Our current survey shows 16.6%, which is in line with previous results. Among fistula changes occurring in infancy, ventricular septal defect is the most common. Then there is a defect of the atrial septum, the patent ductus arteriosus, and the transposition of the great arteries [TGA]. Immune disorders were found in 3 patients [10%], which is consistent with previous studies, in which immunological disorders were found in 7.7–17.75% of cases. All our cases were hypogammaglobulinemia and recurrent pneumonia. Immunodeficient children have recurring and / or severe infections that may be caused by unusual organisms or that involve many places outside the lungs. Immunoglobulin replacement therapy has reduced the frequency and severity of infections in hypogammaglobulinemia, although long-term pulmonary complications may occur. Bronchial asthma is a common respiratory disease and is also considered a cause of recurrent and persistent pneumonia, usually in older children. Often, pneumonia can be an initial symptom without the classic form of asthma. We found 3 patients [10%] who were clinically and functionally diagnosed. Our finding is in line with the results of

previous studies in which bronchial asthma was found in 15–69% of cases. The aspiration team accounted for 13.3% of our patients; 2 of them were secondary to GERD and 2 had FB aspiration. GERD is an important cause of recurring aspirations. Lack of throat coordination is also an important cause, especially in children with cerebral palsy or other neuromuscular disorders. Patients with FB aspiration were recommended bronchoscopic foreign body removal in a chest disease hospital. Aspiration Syndrome is the most common cause of recurrent / persistent pneumonia in most studies. We found 2 children [6.6%] with bronchiectasis who could not be identified. One patient had measles, although it was difficult to diagnose bronchiectasis after measles. The patients' CT report suggested bronchiectasis, and the patients were discharged from supportive care and recommended for follow-up. We found one patient [3.3%] with congenital agenesis of the right lung, diagnosed on the basis of chest computed tomography. The patient had symptoms of persistent pneumonia. In previous studies, congenital defects of the respiratory tract were found in 3.7–8.5% of cases. This retrospective study had some limitations. Our data was limited to children assessed in one unit; the most commonly known etiologies were pulmonary tuberculosis and congenital heart disease. Tuberculosis is an infectious disease. Appropriate healthcare measures should be taken to prevent TB transmission in the pediatric age group. Congenital heart disease should also be carefully monitored in the treatment of recurrent / persistent pneumonia.

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