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Childhood Pneumonia in the University of Ilorin Teaching Hospital

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SUMMARY

Fagbule D, Adedoyin MA. and Nzeh DA. Childhood Pneumonia in the University of Ilorin Teaching Hospital. *Nigerian Journal of Paediatrics* **1987; 14:0.** Analysis of 330 children aged 10 days-14 years admitted with pneumonia, to the University of Ilorin Teaching Hospital between July 1985 and June 1986 shows that the number represented 11.1% of all paediatric admissions during this period. Monthly distribution showed two peaks, from July to October, and January to March. The peak age incidence was 0–24 months, and male, female ratio was 1.7:1. Bronchopneumonia was diagnosed in 83.3% and lobar pneumonia in 16.7%, with cough, fever and breathlessness being the commonest presenting symptoms. Heart failure was a major complication, and severe anaemia the commonest co-morbid condition. Antibiotic treatment was instituted in all patients. Mortality was 9.7%. Immunisation against measles and pertussis, as well as early recognition and treatment of respiratory infections will enhance child survival.

Introduction

PNEUMONIA is a common childhood disease[1] and although the mortality has declined over the years in developed countries,[2] it remains an important cause of death in the third world. Studies carried out in Nigeria have shown that pneumonia is one of the three leading causes of mortality in children.[3–5] It is also a major cause of morbidity worldwide. Recently, calculated annual attack rates for pneumonia in pre-school children in the United States averaged 40 per thousand and dropped gradually to nine per thousand in 9 to 15-year olds.[6] There are seasonal variations in the incidence of pneumonia related to the frequency of other respiratory infections such as influenza and coryza. Malnutrition and overcrowding probably contribute to the increased frequency of and mortality from pneumonia in the poorer social classes.[1]

The aim of the present study was to analyse the pattern of pneumonia in children admitted to the University of Ilorin Teaching Hospital (UITH) with a view to suggesting ways of improving the attendant morbidity and mortality.

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Materials and Methods

Three hundred and thirty children (206 boys and 124 girls) with pneumonia, admitted to the Emergency Paediatric Unit (EPU) and Children's Ward of the University of Ilorin Teaching Hospital (UITH) between July 1985 and June 1986 were included in the study. The diagnosis of pneumonia was based mainly on clinical presentation and confirmed on chest radiograph and/or isolation of bacteria from lung puncture aspiration. Where chest radiographs were available, an initial as well as a follow-up film were obtained. Packed cell volumes and total white cell count with differential counts were obtained. Due to non-availability of a regular supply of culture media, not all the patients had blood cultures done. All the patients were followed up in hospital to determine the outcome of the disease, and survivors were followed up in the out-patient department for at least, six weeks after discharge.

Results

During the period of the study, 2,975 children were admitted into the UITH for medical reasons; of these, 330 (11.1%) were cases of pneumonia. The children were aged 10 days to 14 years. Two hund ed and fifty-seven (78%) of the children were aged 2 years and below, and 31 (9.4%) were aged 5–14 years. All the children except six, were from the high density areas of Ilorin. The monthly distribution (Fig. 1) showed two peaks, July to October and January to March corresponding to the rainy and dry harmattan seasons, respectively.

The commonest presenting symptoms consisted of a triad of cough, fever and breathlessness present in 87%, 83% and 60% respectively. Tachypnoea (94%), tachycardia (92%), dyspnoea (84%) and crepitations on auscultation (65%) were the main clinical signs (Table I). Five older children presented with chest pain. There was no case of haemoptysis. Only 4 patients (1%) presented within 24 hours of the illness, 279 (84%)

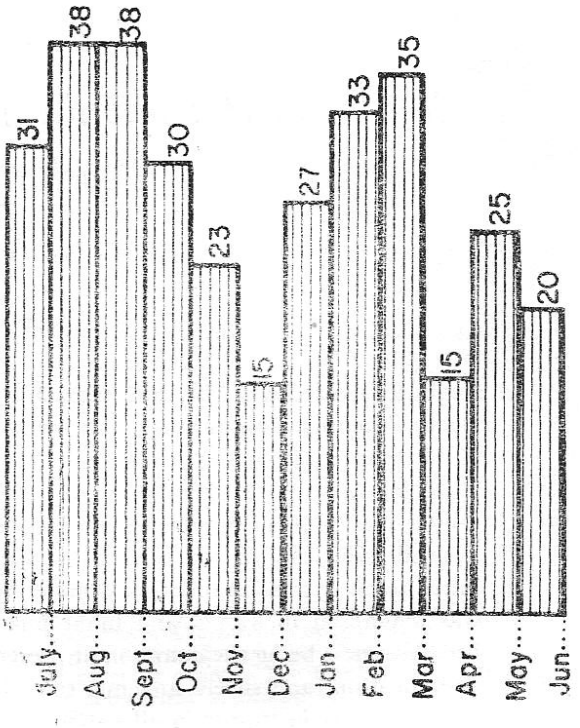

Fig. 1 Histogram of seasonal distribution of pneumonia in 330 children. The number of cases admitted per month is indicated.

within one week, while 45 (14%) had been ill for more than one week. The duration of illness was not certain in 2 children who were brought by surrogate parents. A clinical diagnosis of broncho-pneumonia was made in 275 (83%) and lobar pneumonia in 55 (17%) cases. Based on clinical and radiological findings, 151 (46%) had a severe infection, 135 (41%) moderately severe and 44 (13%) mild.

The co-morbid conditions encountered included severe anaemia, measles, malnutrition, sickle cell disease, pertussis, asthma, malaria, congenital heart disease (ventricular septal defect) and cerebral palsy. Complications of pneumonia identified included heart failure (46%), gastro-enteritis (19%). septicaemia (14%), pleural effusion (3%), empyema (2%) and purulent otitis media (1%).

TABLE I

Clinical Features in 330 Children with Pneumonia

Feature	*No of Patients*	*% of Total*
Symptoms		
Cough	287	87
Fever	273	83
Breathlessness	198	60
Gastrointestinal Symptoms diarrhoea, vomiting	70	21
Antecedent upper respiratory tract infection	51	15
*Convulsions	45	14
Chest pain	5	2
Apnoeic attacks	1	0.3
Signs		
Tachypnoea	309	94
Tachycardia	305	92
Dyspnoea	276	84
Crepitations	215	65
Bronchial breath sounds	55	17

*These were febrile convulsions

Radiological and laboratory findings

Chest radiographs in 75 patients were analyzed. The various radiological appearances encountered are described in Table II. The commonest radiological feature consisted of mottled opacities in the lung fields (Figs 2 and 3) due to patchy consolidation of bronchopneumonia seen in 33 (44%) patients. Twelve patients (16.0%) showed punctate opacities in the perihilar regions due to inflammatory changes. Uniform consolidation of lobar pneumonia (Fig 4) was observed in 9 (12%) patients. There was pleural fluid collection in 6 (8%) cases. Lung collapse with associated mediastinal shift to the ipsilateral side was seen in three (4%) patients. In two (3%) patients, the chest radiograph was normal. Lung abscess, pneumothorax and pulmonary cavity formation were found in two cases each, There were solitary cases of pneumatocceles (Fig 3), hilar gland enlargement, paratracheal adenopathy and subcutaneous/mediastinal emphysema.

Packed cell volume (PCV) ranged between 15% and 47%. One hundred and five patients (32%) had PCV lower than 25%. Peripheral white blood cell counts were available in 70 patients, the range was 2.5–33.1 x 10^9/L. Marked leucocytosis (> 18 x 10^9/L) was noted in 7 patients. Comparison with established normal values indicated that 68 (97%) patients had absolute neutrophilea. Two patients who had associated septicaemia had absolute neutropenia; they both died. Forty patients (12%) had haemoglobin genotype SS.

TABLE II

Radiological features in 75 Children with pneumonia

Feature	*No of Patients*	*% of Total*
Mottled opacities	33	44.0
Perihilar inflammatory opacities	12	16.0
Uniform lobar consolidation	9	12.0
Pleural effusion	6	8.0
Cavitation	4	5·4
Lobar/total lung collapse	3	4.0
Pneumothorax	2	2.7
Pneumatocoeles	1	1.3
Hilar gland enlargement	1	1.3
Paratracheal adenopathy	1	1.3
Subcutaenous/mediastinal emphysema	1	1.3
Normal	2	2.7
Total	75	100 0

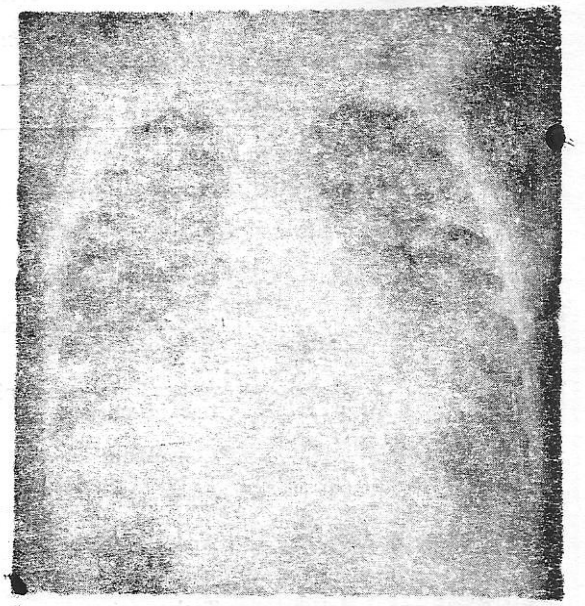

Fig. 3 Bilateral pneumonic changes with pneumatocoles in the left upper lobe.

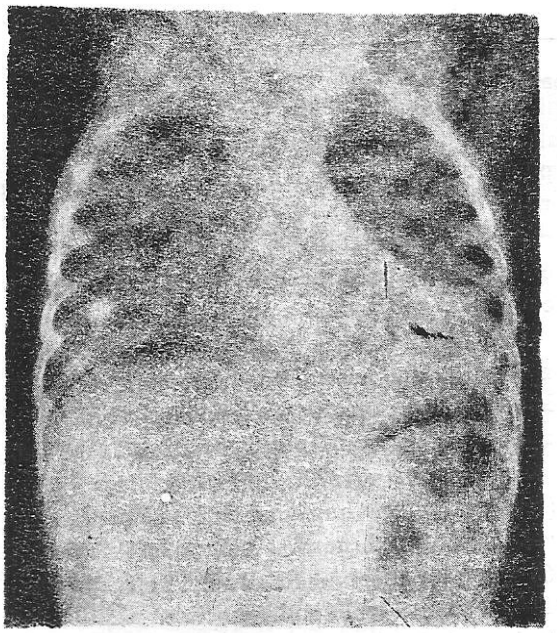

Fig. 2 Patchy consolidation in the right upper lobe and both lower lobes due to bronchoppneumonia.

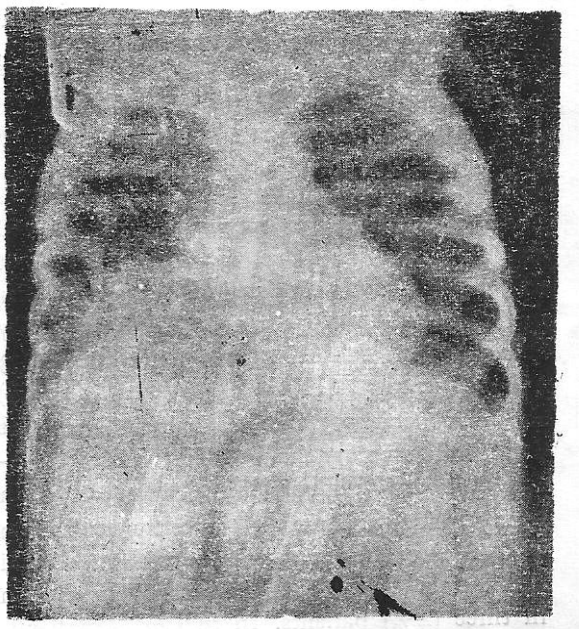

Fig. 4 Uniform consolidation involving the right middle and lower lobes.

The result of lung puncture aspirations for bacterial identification has been reported elsewhere[7]

Treatment and Outcome

Prior to the availability of sensitivity reports, 120 (36%) patients were commenced on cloxacillin and gentamicin, and 93 (28%) on ampicillin and cloxacillin based on the local bacterial flora earlier on reported.[7] Forty-six (14%), mainly children with haemoglobin SS disease, and a few older children with lobar pneumonia received, crystalline penicillin, while 40 others (12%) received crystalline penicillin plus cloxacillin, Other antibiotics used singly or in combination, were erythromycin, chloramphenicol, clindamycin and cefotaxime. All antibiotics except erythromycin were initially given parenterally in the moderate and severe cases. Duration of antibiotic therapy varied between 7 and 14 days. Supportive measures included blood transfusion, correction of fluid and electrolyte disturbances and drainage of effusion and empyema.

The duration of hospitalisation was between 6 hours and 28 days. Twenty one (6%) patients were discharged against medical advice. 3 because the parent felt the children were critically ill and would not benefit from hospital treatment, 2 for financial reasons and one because the mother was abandoned by her husband. There were 32 deaths; an overall mortality of 10%.

Discussion

This prospective study has shown that pneumonia is a major cause of childhood admissions to the UITH having been responsible for 11% of the total admissions during the study period. This high prevalence is probably because acute and chronic respiratory diseases in the paediatric age group surpass those of any other organ systems and age groups.[8] Majority of the children were in the first 2 years of life when immunity is incomplete and when multiple viral infections may predispose to bacterial colonization and/or invasion.[9, 10] Overcrowding contributes to the increased frequency of pneumonia in the poorer social classes.[1] In this study, 98% of the children were from the high density areas of the town where there is greater exposure to domestic smoke from cooking with an increased risk of pneumonia.

A similarly high prevalence of pneumonia during the cold and wet periods was reported by Morley in Imesi-Ile.[11] This is probably due to the tendency for the population to live indoors, associated with reduced ventilation, increasing the spread of droplet infections. A second peak in the dry harmattan season is probably related to the frequency of other respiratory infections such as influenza and coryza during that season.

Clinical signs encountered confirmed that pneumonia may occur in febrile children without obvious respiratory distress or abnormal auscultatory findings.[1, 12] Heart failure occurring as a major complication of pneumonia in this series calls for a closer clinical monitoring of even the mildest cases.

Non-specific mottled opacities accounted for the commonest radiological pattern of childhood pulmonary infection in the present study. When this arises in association with measles, there is usually an initial non-specific infiltration of the lung fields due to interstitial opacities. O'Donova and Barua[13] have suggested that the extent of lung field involvement in measles, correlates well with clinical severity of the disease. One patient in the current series developed post-measles pneumomediastinum and subcutaneous emphysema complicating bronchopneumonia. Surgical emphysema of the soft tissues of the chest wall, neck and mediastinum is a known complication of measles bronchopneumonia and it has been established that poor nutrition leads to a greater likelihood of such complication[14]

Perihilar inflammatory opacities were the second most commonly seen radiological pattern and usually appeared as punctate opacities. Patients in this group do not usually present with debilitating illness. When uniform consolidation of lobar pneumonia does occur, the clinical features are like those found in adults such as dyspnoea and bronchial breath sounds.

Pleural effusion is a well recognised complication of pulmonary infection. In children, the pleural fluid may track along the chest wall and is then referred to as lamella effusion which sometimes spares the costophrenic sulcus. Thin walled cavities or pneumatocoeles were found in association with staphylococcal pneumonia in one patient.

The presence of absolute neutrophilia in 97% of those whose white cell count values were determined, suggests predominant bacterial pneumonia. This lends support to the use of antibiotics in infants and young children presenting with pneumonia. This is contrary to reports from USA[8] [12] and Denmark[15] where viruses predominate and only a small percentage would require antibiotics. No characteristic clinical or laboratory feature distinguished the various types of bacterial pneumonia in this study.

Prior to sensitivity reports, treatment was based largely on the local practice. *Staphylococcus aureus, Streptococcus pyogenes* and *Klebsiella* species were the three commonest organisms isolated in a previous study carried out in this hospital.[7] This would explain the predominant use of ampicillin and cloxacillin or cloxacillin and gentamicin prior to laboratory reports. We agree with Long[12] that parenteral therapy should be administered to hospitalized, moderately to severely ill patients, and to those who have complicated pneumonia or compromising underlying disease. On the other hand, oral therapy is appropriate in mild to moderately ill patients without underlying illness, with uncomplicated pneumonia, and in whom compliance can be ensured. Current practice sets duration of treatment at seven to ten days.[12]

A mortality of 10% is an evidence that childhood pneumonia is of public health concern. Emphasis in health education is largely on prevention. Immunisation against measles and pertussis which can cause acute respiratory infection or pneumonia should be encouraged. The community should be aware of the urgency to bring children with fever and respiratory distress to hospital for immediate intervention. If the clinician on his part, considers pathophysiologic mechanisms, seeks clues through history and physical findings, and institutes the appropriate antibiotic agent, he can judiciously manage children with pneumonia with confidence, few laboratory tests and limited antimicrobials.

Acknowledgement

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