Clinical, Nutritional and Radiological Features of Pneumonia

Pages with reference to book, From 95 To 99

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Abstract

From December, 1992 to February, 1993,100 consecutively admitted children between 2-24 months of age with pneumonia were studied. They were diagnosed and treated according to the National ARI Control Programme case management guidelines. Of the total, 74 were under one year of age. Seventeen children had very severe pneumonia, 77 severe pneumonia and 6 simple pneumonia. Sixty children had radiological evidence of pneumonia, 89 responded to standard recommended treatment and only 11% required a change of therapy. There were no deaths. Only 6 mothers of these 100 children had practiced exclusive breast feeding. Low socioeconomic status, illiteracy and malnutrition were the other risk factors. In this study all types of pneumonia were more common in children under one year of age and radiology did not appear to be essential for its diagnosis. The National AR! Control guidelines for diagnosis and management of hospitalized children are simple, useful and effective (JPMA 46:95, 1996).

Introduction

Pneumonia is the leading cause of childhood moibidity and mortality globally[1]. In 1990 acute respiratory infections (ARI) killed 4.3 million children under 5 years of age[2]. Approximately 10,000 children die from pneumonia every day - more than the deaths from diarrhoea or measles[3,4]. The higherprevalence of some risk factors in developing countries predisposes children to pneumonia[3,4]. Among these risk factors are young age[5], lack of breast feeding[6-8] malnutrition[9], poor vaccination status[10] and some congenital anomalies[11]. All these influence host immunity and defence.

The World Health Organization (WHO) has developed a protocol for management of AR! in children[12] which has been adapted by the National ARI Control Programme of Pakistan[13,14]. Early recognition andproper case management are the mainstay of these guidelines for reduction of mortality and mothidity from pneumonia[15].

The objective of this study was to determine the effectiveness of National AR! (NARI) Control Programme guidelines for management of pneumonia in in-patients and to assess some risk factors related to severity and prognosis of pneumonia.

Patients and Methods

The study was conducted at The Children's Hospital, Pakistan Institute of Medical Sciences, Islamabad. This is a referral centre for a large population in and around the twin cities of Islamabad and Rawalpindi.

All children with pneumoma admitted between December 1992, -February 1993, were studied prospectively. This is the peak season for ARI in this region, Children 2-24 months old presenting with cough and/or difficult breathing were assessed and classified according to National AR! Control Programme guidelines[13,14]. Seventy-seven fulfilled the criteria of severe pneumonia, 17 very severe pneumonia and 6 simple pneumonia. Six children with simple pneumonia were admitted because they had not responded to initial oral anti-microbial therapy.

History of illness, parental education, socio-economic status, feeding, vaccination, medications taken before admission for current illness was recorded on a proforma. Physical examination, laboratory investigations and radiological examination were also performed. Nutritional status was determined according to Gomez classification. Underlying congenital and other, abnormalities were also investigated. A pediatric radiologist, blinded to the clinical diagnosis reviewed the roentgenogram. Children with severe pneumonia were treated with parenteral ampicillin 200 mg/kg/day and those with very severe pneumonia with parenteral chloramphenicol 100 mg/kg/day sixhourly. Afterimprovement, they were switched over to oral amoxycillin in cases of severe and oral chloramphenical in very severe pneumonia to complete 10 days[14].

If a child deteriorated or did not improve clinically within 48 hours, a change in antimicrobial therapy was made according to the NARI guidelines[14]. An earlier change in therapy was made on the basis of clinical judgement.

Definitions

Feeding Practices: a) Exclusively breast fed: given breast milk and vitamins only; b) predominantly breast fed: given breast milk and other non-milk liquids; c) mixed fed: given both breast milk and other milk; d) never breast fed: never given breast milk; e) initially breast fed: bottle feeding at the time of admission but for an initial short period after birth, given breast milk.

Gainfully employed: Any work for which the respondent gets financial renumeration,

Education

Illiterate: One who has not attended a formal school. Primary: One who has completed 5 grades ma school. Secondary: Who has completed upto 10 grades. College: Who has completed 12 or more grades.

Statistical analysis

Umvariate analysis was carried out for clinical characteristics and bivariate analysis for clinical severity of pneumonia, nutritional factors and radiological diagnosis. Chi square test was used for testing statistical significance for bivariate analysis.

Results

Of 100 children included in this study, majority (66%) were males under one year of age (74%). Most (80°4) children belonged to lower socioeconomic groups (incomeRs.3000/month). Fifty-seven percent mothers were illiterate and 8% were gainfully employed (Table 1).

Table I. Demographic characteristics of hospitalized pneumonia patients. n=100 (=%)

Factors	No.=%	
Age		
2-5 months	50	
6-11 months	24	
12-24 months	26	
Sex		
Boys	66	
Girls	34	
Family Income per month (Rs).		
Lower (1500)	39	
Lower Middle (1501-3000)	47	
Upper Middle (3001-4500)	9	
Lower Upper (4501-6000)	5	
Parental Education	Mothers	Fathers
Illiterate	57	27
Primary	14	12
Secondary	17	35
College	12	26
Gainfully employed mothers	8	93

Table II. Clinical characteristics of pneumonia patients (n=100)

Duration of illness in days	
0-3	28
4-7	48
8 or more	24
Antibiotic taken before admission	
None	14
Taken	86
Nutritional status (Gomez classification)	
Normal	66
First degree malnutrition	14
Second degree malnutrition	10
Third degree malnutrition	10
Fully vaccinated	43
Mother's complaint of fast breathing and actual record	
Mother's complaint	91
Actual fast breathing recorded	84
Mother's complaint of fever and actual fever recorded	
Mothers complaint	94
Actual fever recorded	51
NARI signs for pneumonia	
Fast breathing	84
Lower chest indrawing	94
Danger signs	17
Auscultatory findings	
Crackles	97
Rhonchi	34
Bronchial breathing	3
Success of NARI recommended therapy	89

Table II shows the clinical characteristics of pneumonia patients. Only 28% children came to the hospital within 3 days of illness. Eighty-six percent had received antibiotics in some + form, prior to admission. Majority (66%) of the children were well nourished and 43% were fully vaccinated. Fast breathing was the main complaint whichcorrelated well withthe clinical examination (84%). Lower

chest indrawing was present in 94% and 17% had additional danger signs. Ninety-seven percent had crackles and 3% had bronchial breathing on auscultation. Eighty- nine percent improved with NARI Standard Case Management and only 11% needed a change in therapy. Of these 11%, 1 child had pyopneumothomx, 5 associated hypotoma, cerebral palsy, Gaucher disease and severe undernutrition. Whereas, other five children did not have any associated illness.

Table III. Comparison of NARI diagnostic criteria for pneumonia and radiological assessment (n=100).

Radiological diagnosis	Clinical			
	Pneumonia	Severe pneumonia	Very severe pneumonia	Total
No pneumonia	4	30	6	40
Broncho pneumonia	2	38	10	50
Lobar pneumonia	-	8	1	9
Pyo pneumothorax	-	1	-	1
Total	6	77	17	100

Table III shows the comparison of radiological and clinical diagnosis. There was radiological evidence of pneumonia in 60% children. Fifty percent had bronchopneumonia, 9% lobar pneumonia and one pyopneumothomx. Total leucocyte count was less than 11,000/cm3 in 56% cases.
The feeding pattern of 100 children is shown in Table IV.

Table IV. Relationship of severity of pneumonia with feeding pattern of children (n=100).

Pattern of feeding	Pneumonia	Severe pneumonia	Very severe pneumonia	Total
Exclusively breast fed	-	5	1	6
Predominantly breast fed	1	16	2	19
Mixed feeding	3	25	7	35
Never breast fed	2	10	4	16
Initially breast fed after birth but later breast milk stopped	-	21	3	24

Exclusive breast feeding was practiced by only 6 of mothers while 75 gave non-milk fluids after birth.

Twenty-four mothers had stopped breast feeding; of these 8, (3 3%) mothers did so before their children were two months of age, 4(17%) stopped between 2 and 4 months of age and the other 12(50%) did so between 4 and 6 months of age. When supplementary food practices were inquired. 67% reported giving biscuits and sometimes banana upto the age of one year and generally avoided the "family pot".

Discussion

This study shows that NARI Standard Case Management is effective in in-patient treatment of pneumonia. The guidelines for management of pneumonia, severe pneumonia and very severe pneumonia are simple and applicable in a tertiaiy care hospital as well as at the primary care facilities[16]. Pneumonia in developing countries and in Pakistan as well, is mainly of bacterial etiology[17,18] and needs treatment with appropriate antibiotics. There has been a trend among physicians in developing countries to treat pneumonia with variety of antibiotics, occasionally with more than one antibiotic at a time[19,20]. Probably this polypharmacy is due to poor knowledge about etiology of pneumonia and also due to lack of confidence in one single antimicrobial drug. Prior to admission most of the children had received antibiotics in orni or injectable form, mostly given inappropriately. This shows the misuse of antibiotics in the communily. Other studies have also shown inadequate and inappropriate use of antibiotics in ARJ[21,22]. The children in our study had received antibiotics ranging from penicillin to cephalosporin. The use of inexpensive antibiotics like cotrimoxazole, penicillin and chioramphenicol in ARI standard case management inpneumonias has been shown to be effective[16,20,23,24]. The simple, effective and low cost standard case management guidelines are needed as much in the hospitals as in the isolated primary health care centres and poor communities.

When antibiotics were used in our admitted patients, according to NARI standard case management guidelines in appropriate dose, majority of children responded regardless to prior use of antibiotics.

We also compared the conventional clinical method of auscultation for diagnosis of pneumoma with NARI diagnostic criteria of fast breathing, chest indrawing and other danger signs. The NARI assessment protocol was compared with the traditional clinical examination, looking for signs of respiratory distress and listening to crackles and ralesonauscultation. The accuracy of diagnostic criteria of NARI protocol was as sensitive as traditional methods of diagnosis. The NARI protocol was simpler to follow and it also classified pneumonia into various stages according to the severity of disease. This helped indecision making during the case management. A number of workers have found these clinical signs to be reliable predictors of pneumonia and severe pneumonia[25-27].

Radiology has been considered important in the diagnosis of pneumonia. In our study fewer than two third of the children had radiological evidence of pneumonia, though clinical criteria for diagnosis of pneumonia were fulfilled. This shows that chest radiography is not as sensitive and essential a criterion for diagnosis of pneumonia as the simple clinical signs like fast breathing and lower chest inclrawing[26-29]. Radiological changes appear later than the development of sensitive simple signs like fast breathing[25,26]. So, if diagnosis is only based on radiological evidence, it would possibly result in higher mothidity and mortality by virtue of increased severity of disease because radiological changes may take time to develop.

Young age is particularly a risk factor for developing pneumonia[30-33]. Half of the children in this study also were below 6 months of age and almost two third were under one year of age.

The impact of nutritional factors was also evaluated. Breast feeding in developing countries is not merely baby friendly but is essential for child survival. The superiority of human milk and breast feeding over formula and bottle is well documented[34,35]. Breast fed children have lower risk of ARI

mothidity and mortality[7,36]. On the contrary few workers like Leventhal[37], Bauchner[38] and Hakansson[39] found a minimal protective effect of breast feeding. Victora6, Lapage[8] and Launer[40] found that breast fed children had a lower incidence of ARI[6,8,40]. Chen et al found the protective effect of breast feeding greater for respiratory infections than for gasteoenteritis[41] . Breast. feeding protects against viral pneumonia as well[42]. In our study very small number of children were exclusively breast fed and a significant number of children with pneumonia were suboptimally breast fed. This shows beneficial effect of breast feeding. However, because of the small sample size and the study design we were unable to assess exact relationship between breast feeding practices and severity of disease.

High incidence of ARI in lower socio-economic status has been described[43-44]. Poor socio-economic group are also related to poor housing conditions. Low literacy and poverty also contributes to the severity of pneumonia because these parents may bring their children late to the hospital resulting in delay of appropriate treatment. Majority of our patients belonged to lower socio-economic groups and their ,thothers were illiterate. Illness in this gmup of children was more severe and hospitaistay was also longer. Severity of disease in our study was less in children brought within 3 days of illness. Response to treatment in chidi brought early, was good and hospital stay Was short. Early health care seeking behaviour and recognition of signs of pneumonia should fonn an integral part of the future communications strategy for the NARl in the future.

Malnutrition is recognized as an important risk factor for developing pneumonia[45-47]. In our study, majority of the children were well nourished. The children who were malnourished had also not been breast fed and their duration of stay in hospital was longer than of well nourished children.

We conclude that NARI antibiotic therapy recommended for severe pneumonia and very severe pneumonia is effective. NARI programme standard case management guidelines for the small hospitals work for a tertiary care facility like ours. Use of simple clinical signs like fast breathing, lower chest indrawing and danger signs are an efficient way of diagnosing and classifying pneumonia.

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