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Clinical Profile and Outcome of Pneumonia in Children

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ABSTRACT
Pneumonia is one of the largest killers of children under five years of age around the world. The present study was done to study the clinical features, outcome, bacteriological profile and radiological features of pneumonia in children. This was a descriptive study of pneumonia conducted on 100 children in the age group of 1 month to 12 years, with clinical features of tachypnoea as per WHO criteria and chest indrawing, who got admitted in pediatric wards of Rajah Muthiah Medical college, Annamalai University, Chidambaram during November 2014 to August 2016.Study showed that 82% of the children belonged to the age group of 1-month - 5year, male to female ratio was 1.17:1. Rapid breathing/ respiratory distress (100%), cough (100%) and fever (99%) were the most common symptoms. Refusal of feeds was present in 24% cases. Tachypnoea (100%), chest retractions (100%) and crepitations (82%) were the most common signs. Diarrhoea (7%), meningitis(3%) ,CCF(1%)were the associated illness. 71% were breast-fed and 29% were given bottle feeds. 55% were anemic. 62% had grade 1 and 2, 30% had grade 3 and 4 PEM. From the study, it was concluded that pneumonia is one of the major causes of morbidity and mortality in children. Blood culture will not give much information regarding etiology of pneumonia. Chest X-ray is valuable aid in the diagnosis of pneumonia in children.
Key Words: *Pneumonia, WHO criteria, PEM, Mortality.*

INTRODUCTION

Respiratory tract infections are perhaps the most common human ailment. While they are a source of discomfort, disability and loss of time for most of the adults, they are a substantial cause of morbidity and mortality in younger children. In India, in the year 2013, about 31.7 million cases of ARI were reported. During 2013 about 3,278 children died of ARI and 2,597 died of pneumonia. Pneumonia was responsible for about 18% of all under 5 deaths in India. The present study was designed to clinically study children with pneumonia, to evaluate radiological findings associated with it, to determine bacteriological profile and antibiotic sensitivity of organisms isolated.

MATERIALS AND METHODS

This was a descriptive clinical study of pneumonia conducted on 100 children who were admitted to pediatric wards in Rajah Muthiah Medical College, Annamalai University, Chidambaram during November 2014 to August 2016. Children between l month-12 years presenting with clinical features of tachypnoea as per WHO criteria and chest indrawing in study period were included. Cases were followed up for a period of one month to determine cases of
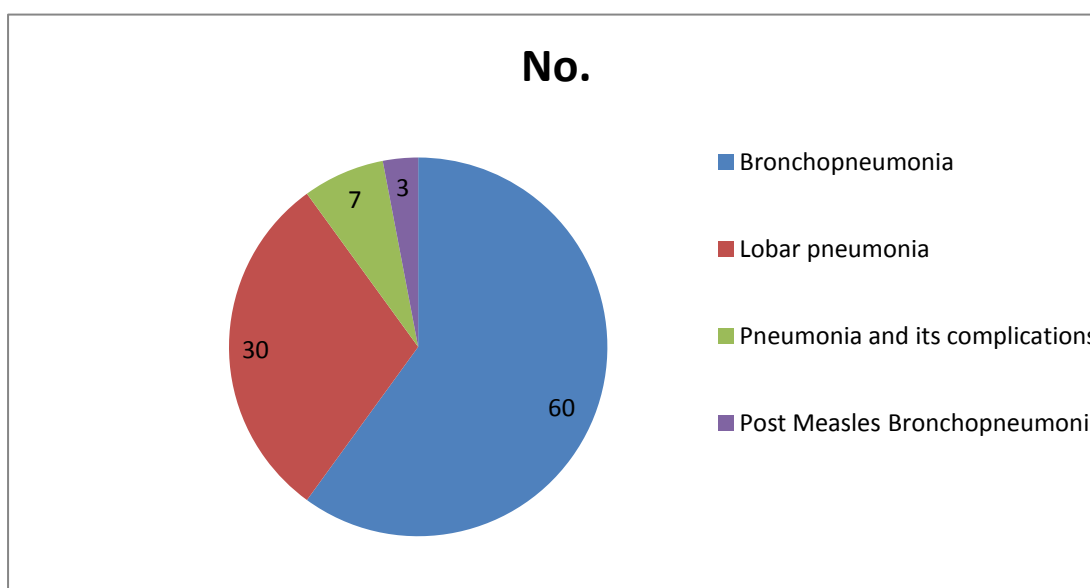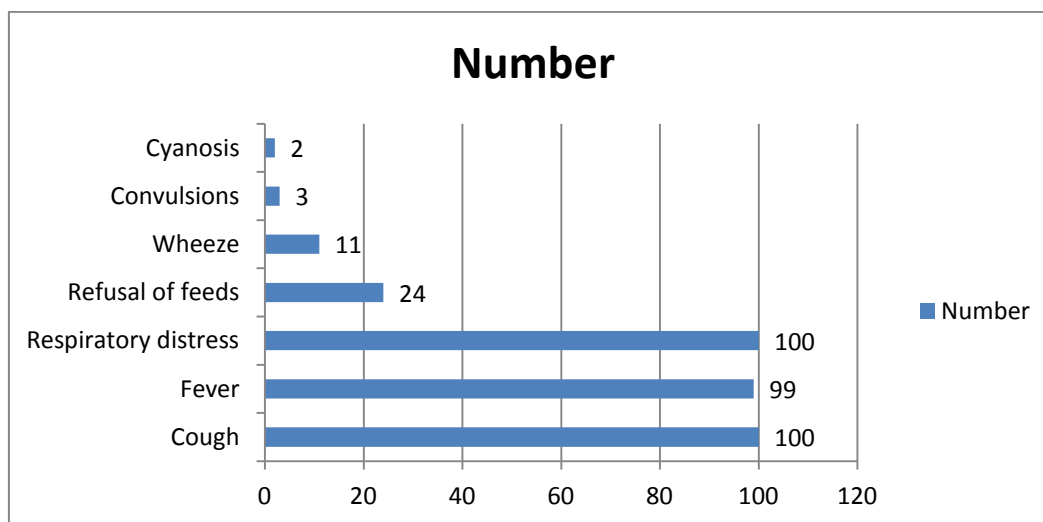
persistent pneumonia .Children with congenital anomalies of heart and lungs, anatomical defects like cleft lip and palate, immune compromised states like HIV, children on immunosuppressant drugs, children whose symptoms got relieved after three doses of bronchodilator therapy were excluded. A detailed history of the relevant symptoms such as fever, cough, rapid breathing, refusal of feeds, wheezing etc was taken. A detailed general examination of each child including anthropometry was carried out. Detailed systematic examination was done. Any associated illness such as diarrhoea, meningitis and congestive cardiac failure if present was noted. Socio economic history, immunization status, feeding practices and degree of malnutrition (IAP classification) were also recorded. Investigations included chest X ray, CBC, blood culture. Based on radiological findings, children were divided into Bacterial (bronchopneumonia, consolidations, alveolar infiltrates) and Viral (interstitial infiltrates, hyper aeration) pneumonias. Follow up X-rays were taken in relevant cases.

RESULTS

The most affected children belonged to the age group of 1 month -5year (82%).Males outweighed females with male to female ratio of 1.17:1.

Rapid breathing (100%), cough (100%) and fever (99%) were the most common symptoms. Refusal of feeds was present in 24% cases. Tachypnoea (100%), chest retractions (100%) and crepitations (82%) were the most common signs.

A previous history of similar illness was present in 10% of cases a family history of acute lower respiratory tract infections was present in 6% of cases. Diarrhea (7%), meningitis (3%) and CCF (1%) were the associated illness.

Bronchopneumonia (60%) was the most common clinical diagnosis made at admission. A diagnosis of lobar pneumonia was made in 30% and pneumonia with its complications in 7% of cases. Bacterial pneumonia was detected radiologically in 73% and viral pneumonia in 13% of cases.

Chest X-ray was normal in 14% of cases. Among bacterial pneumonias, bronchopneumonia was the most common form.80% of cases showed complete radiological resolution after treatment. Two cases showed persistence of radiological features even after 4 weeks and was termed as persistent pneumonia. Tachypnoea, chest retractions, crepitations alone and crepitations with rhonchi correlated well with positive radiological findings.

Clinical data	No.	Radiological findings	
		Positive findings	**Normal**
Tachypnoea	100	86(86%)	14(14%)
Chest retractions	100	86(86%)	14(14%)
Crepitations only	32	26(81.25%)	06(18.75%)
Crepitations +ronchi	50	45(90%)	05(10%)
Ronchi only	02	01(50%)	01(50%)
Abnormal breath sounds	17	17(100%)	0(0%)

In this study, 74% were immunized to date and 4% did not receive any vaccine.71% were breast-fed and 29% were given bottle feeds. 55% were anemic. 62% had grade 1 and 2 PEM and 30% had grade 3 and 4 PEM. Anemia was present in 55%.

Majority (88%) were from poor socioeconomic status(grade 3, 4 and 5 modified kuppusamy classification). 88% lived in ill ventilated, thatched house (kutcha) and 56% Of houses were crowded. 90% did not have good sanitary facilities and 64% used fuel other than LPG for cooking.

On investigation, 60% had leucocytosis. Neutrophilia was seen in 72% and lymphocytosis in 10% of cases. ESR was elevated in 69% of cases. Blood culture was positive in 14% of cases. S.aureus (10 cases) was the commonest organism isolated followed by Klebsiella. Maximum organisms were found to be sensitive for vancomycin, linezolid, Amikacin. Case fatality rate was 6%. Majority of deaths occurred within 24 hours of presentation to hospital.

Out come	Sex				Total
	Female		Male		
	N	%	N	%	
5-8 days	30	65.2	37	68.5	67
>8days	11	23.9	14	25.9	25
Death	3	6.5	3	5.6	6
Persistent pneumonia	2	4.3	0	0.0	2
Total	46	100.0	54	100.0	100

DISCUSSION

Age distribution - Age is an important predictor of morbidity and mortality in pediatric pneumonia .In the present study, conducted between the age group of one month to twelve years, majority (82%) were less than 5 years. This was in comparison with CDC EPIC study (70%).

Symptomatology:

Symptoms	Kabra SK et al	Kumar N et al	Present
Fever	82%	88%	99%
Cough	98%	100%	100%
Rapid breathing	90%	100%	100%
Refusal of feeds	42%	22%	24%

The incidence of presenting symptoms in our study are comparable with studies conducted by Kabra SK et al and Kumar N et al.

Signs

Tachypnoea has been proved to be a sensitive and specific indicator of the presence of pneumonia. Also the traditional, method of making a clinical diagnosis of pneumonia has been by the recognition of auscultatory signs, in particular crepitations, in a child with cough.

In our study, tachypneoa (100%) and chest retractions (100%) were the important signs for making a clinical diagnosis of pneumonia. Crepitations (82%), rhonchi (52%) and abnormal breath sounds (17%) were the other associated signs. Gupta D et al, Margolis P et al, Palafox M et al, have observed that tachypnoea and chest retractions were highly specific signs in detecting pneumonia. Reddaiah VP et al, have reported that crepitations were found in 76% and rhonchi in 23.2% of patients with pneumonia.

Associated illness

In our study, pneumonia was associated with diarrhea in 7%, congestive cardiac failure in 1%, and meningitis in 3%. This was in comparison with studies done by Deivanayagam N et al and Sehgal V et al.

Sex Distribution- In our study it was observed that male (54%) outweighed females (46%). Male: female ratio was 1.17:1.This was in comparison with studies done by Sehgal V et al (male-58.25) and Drummond P et al. (male-58%).

Clinical Diagnosis

In our study bronchopneumonia was the most common diagnosis made at admission (60%), lobar pneumonia in 30%, pneumonia with complications in 7% and post measles bronchopneumonia in 3% of cases. Complications of pneumonia include pleural effusion (3%), collapse (2%) and pneumothorax (2%). In a study conducted by Reddaiah V.P et al, bronchopneumonia was diagnosed in 64%, lobar pneumonia in 6.4% and post measles bronchopneumonia in 4.0% of cases.

Radiological findings

In our study chest x-ray showed radiological changes consistent with pneumonia in 86% of cases. This was in comparison with CDC EPIC study (89%). Evidence of bacterial infection was found in 73% and viral in 13% of cases.

The reasons for higher incidence of radiologically detected bacterial pneumonia in our study may be due to high incidence of bacterial pneumonia in developing countries like ours. Also there may be variations in intra observer and inter observer agreement on the radiographic features used for interpreting the radiogram.

In our study, follow up radiographs were taken in 60% of cases; 80% showed complete resolution after treatment and 20% partial resolution.

Heaton P et al, in their study on utility of chest radiography in the follow up of pneumonia, has

found that 90.2% had normal chest radiographs after treatment. They also concluded that in cases of uncompleted pneumonia, follow up chest radiography is not indicated if symptoms and signs are absent.

Clinical data in comparison with radiological findings

In our study, we compared the clinical data with radiological findings and found that tachypnoea (86%), chest retractions (86%), crepitations (81.25%), crepitations with rhonchi (90%) and abnormal breath sounds (bronchial breathing, diminished breath sounds) correlated well with positive radiological findings.

In a study conducted by Zukin DD et al, it was found that the sign with highest positive predictive value for the presence of any radiographic abnormalities was tachypnoea and chest examination findings such as crepitations and abnormal breath sounds comprised of a high-risk group, which increased significantly the likelihood of pneumonia.

There is frequent disagreement between pneumonia diagnosed by clinical examination and that diagnosed by chest radiography. Radiographs appear to have greater impact on diagnosis and management when any inconsistencies arise.

Blood Culture

In our study, blood culture was positive in 14%. S.aureus was the most common organism isolated (10 cases) followed by Klebsiella (2cases), Pseudomonas (2 cases).

This was in comparison with study done by G R Karambelkar et al (17%) with most common organism being isolated being S.aureus.

Mortality

In our study, case fatality rate was 6%. 66.67% (4 cases) of deaths occurred within 24 hrs of presentation to hospital.

This is in comparison with studies conducted by Sehgal V et al, Reddaiah VP et al who have reported a case fatality rate of 10.45%, 12.8% respectively.

CONCLUSION

ARI, especially pneumonia is one of the major causes of morbidity and mortality in children. Bronchopneumonia is the predominant form of presentation in children. Symptoms and signs like cough, fever, tachypnea, chest indrawing, crepitations mentioned in the WHO ARI control programme were very sensitive and can be applied to hospitalized children Blood culture will not give much information regarding etiology of pneumonia. Chest X-ray is valuable aid in the diagnosis of pneumonia in children. Follow up chest roentgenogram is vital for evaluating the response to treatment in pneumonia.

REFERENCES

1. Park K. Acute respiratory infections. In: Park's text book of preventive and social medicine, 23rd ed. Jabalapur: M/s Banarasidas Bhanot publishers; 2015. p.167-74.
2. Govt.of.India (2014), National health profile 2013, DGHS, Ministry of health and family welfare.
3. Jain S, Williams DJ, Arnold SR, Ampofo K, Bramley AM et al for the CDC EPIC study team. Community-Acquired Pneumonia Requiring Hospitalization among U.S. Children N Engl J Med 2015; 372:835-45.
4. Sehgal V, Sethi GR, Sachdev HPS, Satyanarayana V. Predictors of mortality on subjets hospitalized with acute lower respiratory tract infections. Indian Pediatr, 1997; 34: 213-9.
5. Drummond P, Clark J, Wheeler J, Galloway A, Freeman R, Cant A. Community acquired pneumonia-a prospective UK study. Arch Dis Child 2000; 83: 408-12.
6. Kabra SK, Broor S, Lodha R, Maitreyi RS, Ghosh M, Pandey RM, et al.Can we identify acute severe viral lower respiratory tract infection clinically? Indian Pediatr 2004; 41: 245-9.
7. Kumar N, Singh N, Locham KK, Garg R, Sarwal D. Clinical evaluation of acute

respiratory distress and chest wheezing in infants. Indian Pediatr 2002; 39: 478-83.

8. Gupta D, Mishra S, Chaturvedi P. Fast breathing in the diagnosis of pneumonia-a reassessment.1996; 42: 196-9 J Trop Pediatr .

9. Margolis P, Gadomski A. The rational clinical examination. Does this infant have pneumonia? JAMA 1998; 279: 308-13.

10. Palafox M, Guiscafre H, Reyes H, Mufioz O, Martinez H. Diagnostic value of tachy-pnoea in pneumonia defined radiologi-cally. Arch Dis Child 2000; 82: 41-5.

11. Reddaiah VP, Kapoor SK. Acute respiratory infections in under five: Experience at comprehensive rural health services project hospital Ballabgarh. Indian J Community Med 1995; 20: 1-4.

12. Deivanayagam N, Nedunchelian K, Ramaswamy S, Sudhandirakannan, Ratna SR. Risk factors for fatal pneumonia: A case control study. Indian Pediatr, 1992; 29: 1529-32.

13. Heaton P, Arthur K. The utility of chest radiography in the follow up of pneumonia. N Z Med J 1998; 111: 315-7.

14. Zukin DD, Hoffman JR, Cleveland RH, Kushner DC, Herman TE. Correlation of pulmonary signs and symptoms with chest radiographs in the pediatric age group. Ann Emerg Med 1986; 15: 792-6.

15. Karambelkar GR, Agarkhedkar S, Karwa S,Singhania S, Mane V. Disease pattern and bacteriology of childhood pneumonia in western India.Int J Pharm Biomed Sci2012,3(4),177-80.ISSN No:0976-5263.