ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 02 | February - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

RELATION OF LOWER RESPIRATORY INFECTIONS AND HYPONATREMIA IN PEDIATRIC PATIENTS

Biochemistry

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ABSTRACT

Background: Acute respiratory infections are a leading cause of morbidity and mortality in under-five children in developing countries. Hence, the present study was undertaken to study the various risk factors, clinical profile and outcome of acute lower respiratory tract infections (ALRI) in children aged 2 month to 5 years.

Methods: 100 ALRI cases fulfilling WHO criteria for pneumonia, in the age group of 2 month to 5 years were evaluated for clinical profile as per a predesigned proforma in a rural medical college.

Results: Of cases 61% were infants and remaining 39%12-60 months age group, males outnumbered females with sex ratio of 1.3;1. Elevated total leukocyte counts for age were observed in only 22% of cases, of these 3% were having pneumonia, 9% severe pneumonia and 10% very severe pneumonia. Significant association was found between leukocytosis and ALRI severity (p=0.0001) Positive blood culture was obtained in 8% of cases and was significantly associated with ALRI severity (p=.0.027). Among the ALRI cases, 84% required oxygen supplementation at any time during the hospital stay and 8% required mechanical ventilation. The mortality rate was 1%; with 99% of cases recovering and getting discharged uneventfully.

Conclusion: Among the clinical variables, the signs and symptoms of ALRI as per the WHO ARI Control Programme were found in almost all cases. Regarding the laboratory profile, leukocytosis and blood culture positivity were observed in a small percentage, but significant association with ALRI severity was observed for both. Thus, clinical signs, and not invasive blood tests are better diagnostic tools, though the latter may provide additional therapeutic and prognostic information in severe disease.

KEYWORDS

Hyponatremia, Pneumonia, Respiratory infections

INTRODUCTION

Every year ARI in young children is responsible for an estimated 1.9 million deaths worldwide. It is estimated that Bangladesh, India, Indonesia and Nepal together account for 40 percent of the global ARI mortality. About 90 percent of the ARI deaths are due to pneumonia which is usually bacterial in origin. The incidence of pneumonia in developed countries may be a low as 3-4 percent, its incidence in developing countries ranges between 20 to 30 percent. This difference is due to high prevalence of malnutrition, low birth weight and indoor air pollution in developing countries.[1-3]

ARI is an important cause of morbidity in the children. On an average, children below 5years of age suffer 5 episodes of ARI per child per year, thus accounting for about 238 million attacks. Consequently, although most of the attacks are mild and self-limiting episodes, ARI is responsible for about 30-50 percent of visits to health facilities and for about 20-40 per cent of admissions to hospitals[2].

In India, in the states and districts with high infant and child mortality rates, ARI is one of the major causes of death. Hospital records from states with high infant mortality rates show that up to 13% of in-patient deaths in paediatric wards are due to ARI. The proportion of death due to ARI in the community is much higher as many children die at home. The reason for high case fatality may be that children are either not brought to the hospitals or brought too late. According to WHO estimates, respiratory infections caused about 987,000 deaths in India, of which 969,000 were due to acute lower respiratory infections (ALRI), 10,000 due to acute upper respiratory infections (AURI), and about 9000 due to otitis media. The burden of disease in terms of DALYs lost was 25.5 million.[3] The present study has been done to study clinical profile, laboratory markers and morbidity and mortality pattern in acute lower respiratory infection cases.

METHODOLOGY

After obtaining clearance from the ethical clearance committee present prospective study conducted at Govt. Medical College, Amritsar from January 2019 TO December 2019.

Inclusion Criteria:

Children with ALRI from 2 months to 60 months.

Exclusion Criteria:

Children less than 2 months and more than 60 months. Children with any underlying chronic respiratory or cardiac illness.

Children in the age group of 2 months to 5 year admitted with ALRI during the study period were enrolled in the study as cases. A case of ALRI is defined as per ARI Control Programme as "presence of cough with fast breathing of more than 60/min in less than 2 month of age, more than 50/min in 2 month to 12 month of age and more than 40/min in 12 month to 5 year of age, the duration of illness being less than 30 days". The presence of lower chest wall indrawing was taken as evidence of severe pneumonia. The presence of refusal of feeds, central cyanosis, lethargy or convulsions was taken as evidence of very severe pneumonia. Verbal, informed consent of the child's carer was obtained. A detailed history and physical examination was done according to a predesigned proforma to elicit various potential risk factors and other relevant history. Age of the child was recorded in completed months and age of parents in completed year. Routine haematological investigations were done in all cases to know the degree of anaemia and blood counts; chest x ray was done in all cases to categorise the ALRI into clinical entities and to detect complications, if any. Other specific investigations were done as per requirement in individual cases and all the cases were treated as per the standard protocol depending on the type of ALRI. After entering the data in Excel sheet Chi square test was used for analysis and “p” value <0.05 was taken as significant.

RESULTS

Of the 100 cases included in the study, 16% were classified as pneumonia, 60 % as severe pneumonia and 24% as very severe pneumonia. Of cases 61% were infants and remaining 39%12-60 months age group, males outnumbered females with sex ratio of 1.3;1. Ofthese cases, the final diagnoses were as follows: 41% were diagnosed as bronchilolitis, 26% as lobar pneumonia, 17% as bronchopneumonia, 10% as WLRI (wheeze associated lower respiratory infection), 5% as acute laryngotracheobronchitis (croup) and 1% as empyaema thoracis. Elevated total leukocyte counts for age were observed in only 22% of cases, of these 3% were having pneumonia, 9% severe pneumonia and 10% very severe pneumonia. Significant association was found between leukocytosis and ALRI severity (p=0.0001) Positive blood culture was obtained in 8% of cases and was significantly associated with ALRI severity(p=.0.027). Among the ALRI cases, 84% required oxygen supplementation at any time during the hospital stay and 8% required mechanical ventilation. The mortality rate was 1%; with 99% of cases recovering and getting

discharged uneventfully.

Table 1: Baseline Characteristics Of Study Group

Characteristic		Pneumonia (16)	Severe pneumonia (60)	V. severe pneumonia (24)	Total
Age	2-12 months	10	34	17	61
	13-60 months	6	26	7	39
Sex	Male	9	34	14	57
	Female	7	26	10	43

Table 2: Symptoms And Clinical Diagnosis Of Study Group

Variables	n	%
Symptoms		
Fever	90	90
Cough	100	100
Breathlessness	96	96
Chest indrawing	80	80
Vomiting /Diarrhoea	11	11
Running nose	69	69
Clinical Diagnosis		
Bronchiolitis	41	41
Lobar pneumonia	26	26
Bronchopneumonia	17	17
WLRI	10	10
Empayema thoracis	1	1
Croup	5	5

DISCUSSION

Acute Lower Respiratory Tract Infection (ALRI) is the leading cause of under-5 childhood morbidity in the world, with nearly 156 million new episodes each year, of which India accounts for a bulk of 43 million. The mortality burden is 1.9 million per year, out of which India accounts for around four hundred thousand deaths per year.[1] Among all the children diagnosed with ALRI, 7-13% are severe enough to require hospital admission.[4]

Majority of the patients were admitted with fever, cough and breathlessness as their main complaints (90%, 100% and 96% respectively). The other common complaints were chest indrawing in 80% and runny nose in 69% of patients. Refusal of feeds was present in 24% cases and was the commonest criteria for classifying as very severe pneumonia. Wheeze was complained of by 13% cases and vomiting and diarrhoea were observed in 11% cases. Convulsions were present in 2% of cases.

Of the 100 cases included in the study, 16% were classified as pneumonia, 60 % as severe pneumonia and 24% as very severe pneumonia according to the ARI Control Program guidelines. However, in the study by Savitha et al,[5] 12.51% were graded as pneumonia, 82.69% as severe pneumonia and 4.8 % as very severe pneumonia. Yousif et al6 graded 23.4% as no pneumonia, 48.2% as pneumonia, 19.6% as severe pneumonia and 8.8% as very severe pneumonia.

Male children were observed to be the majority among various studies on children under 5 years with ALRI. Male children constituted 64.42%, 65.8% and 73.1% in the studies by Savitha et al[5]. Our study showed similar results with 57% males among the cases studied. The reason behind this may be that male children are generally cared for more and thus brought earlier and more often for treatment. There was no significant association between sex and ALRI severity, in accordance with the findings of Yousif et al.[6]

Elevated total leukocyte counts for age were observed in only 22% of cases. Out of these, 3% were graded as pneumonia, 9% as severe pneumonia and 10% as very severe pneumonia. However, significant association was found between leukocytosis and ALRI severity. Based on the final diagnosis, bronchopneumonia and lobar pneumonia constituted 81% of the cases with leukocytosis. Leukocytosis has been considered as an important, albeit non-specific correlate of ALRI, particularly those of bacterial aetiology[7].

Positive blood culture was obtained in only 8% of cases; however, significant association was found between blood culture and ALRI severity. The most common organism was Staphylococcus aureus. The reason why this was the most common isolate in this study might be because the majority of children with bacteraemia were severely malnourished and Staphylococcus aureus bacteraemia is commonly associated with malnutrition.[9]

CONCLUSION

Among the clinical variables, the signs and symptoms of ALRI as per the WHO ARI Control Programme were found in almost all cases. Regarding the laboratory profile, leukocytosis and blood culture positivity were observed in a small percentage, but significant association with ALRI severity was observed for both. Thus, clinical signs, and not invasive blood tests are a better diagnostic tools, though the latter may provide additional therapeutic and prognostic information in severe disease.

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