ORIGINAL RESEARCH PAPER

Paediatrics

KEY WORDS: pneumonia, LRTI, radiographical pneumonia, clinical pneumonia

A CORRELATION BETWEEN CLINICAL AND RADIOGRAPHICAL PNEUMONIA

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ABSTRACT

BACKGROUND: Pneumonia, an acute respiratory infection, is the leading cause of mortality in children worldwide. To combat this major issue regarding child health, WHO developed the programme for the control of respiratory infections in 1980s . this study was undertaken to find the various clinical markers and their specificity to the diagnosis of pneumonia

MATERIALS AND METHODS: Intially, all the patients presenting to the pediatric OPD department with symptoms and signs suggestive of pneumonia were identified. identify the specific markers for bacterial pneumonia. Later, clinical features in children with radiological pneumonia were analysed to validate the findings.

RESULTS: there wasn't much difference in the children in terms of age and sex. The list of clinical symptoms and signs that were seen in the children in decreasing order are as follows- cough, tachypnea, crepitations, all the children studied presented with cough and tachypnoea. Fever, and and the clinical presence of crepitations are higher in the radiographical group than the WHO classification group. The presence of wheeze, nasal blockage and stridor were higher in the children with clinical pneumonia. When the lab parameters were evaluated, leucocytosis was significantly higher in patients with radiographically significant pneumonia than WHO recommended clinical pneumonia

CONCLUSION: While radiological confirmation is preferred before diagnosing pneumonia, it is always advisable to look for leucocytosis before the initiation of antibiotics.

INTRODUCTION:

Acute Respiratory Infections (ARI) have quite a high morbidity and mortality in children in developing countries. The World Health Organization (WHO) propose 2-6 million childhood deaths annually attributed to acute lower respiratory tract illnesses (ALRI)(1). ARI is responsible for about 30-50 percent of visits to health facilities and for about 20-40 percent of hospital admissions.

Pneumonia, an acute respiratory infection, is the leading cause of mortality in children worldwide(2). To combat this major issue regarding child health, WHO developed the programme for the control of respiratory infections in 1980s which was included as a component of the integrated management of childhood illness strategy in the mid 1990s. This strategy includes utilization of simple clinical signs and symptoms with high sensitivity and specificity to be adopted at first level health facilities by paramedical personnel(3).

Using this algorithm, pneumonia is diagnosed by the presence of tachypnea defined as respiratory rate >60 breaths / minute among children aged <2 months, >50 breaths / minute among children aged 2-11 months and >40 breaths / minute among the children aged 12-59 months(4). In this scenario, this study was undertaken to find the various clinical markers and their specificity to the diagnosis of pneumonia.

STUDY PROTOCOL:

This study was undertaken as a descriptive study to find the correlation between WHO defined pneumonia and radiological pneumonia. Intially, all the patients presenting to the pediatric OPD department with symptoms and signs suggestive of pneumonia were identified. identify the specific markers for bacterial pneumonia. Later, clinical features in children with radiological pneumonia were analysed to validate the findings.

STUDY PERIOD: MAY 2018- JULY 2019

STUDY PLACE: A TERTIARY HEALTH CARE CENTRE IN SOUTH INDIA

STUDY POPULATION: 50 children

INCLUSION CRITERIA:

Children in the age group 6 months to 60 months with radiologically diagnosed pneumonitis and pneumonia. Pneumonia as defined by the WHO i.e. children with the following symptoms Fever <5 days and Cough & cold < 1 week Age specific tachypnea with or without lung signs (wheeze or crepts) i.e.

≥50 breaths/min in 2 months to 11 months
≥40 breaths/min in 12-60 months (5).

EXCLUSION CRITERIA:

Child with severe illness as defined by WHO like not able to take oral feed, stridor in a calm child, severe malnutrition, convulsions, abnormal sleepy Children with an established diagnosis of bronchial asthma Children who had similar illness in the last 2 weeks Antibiotics used in the last 2 weeks.

Children with established diagnosis of other chronic illness like congenital heart disease, tuberculosis.

Immunodeficient children, or on steroid therapy.

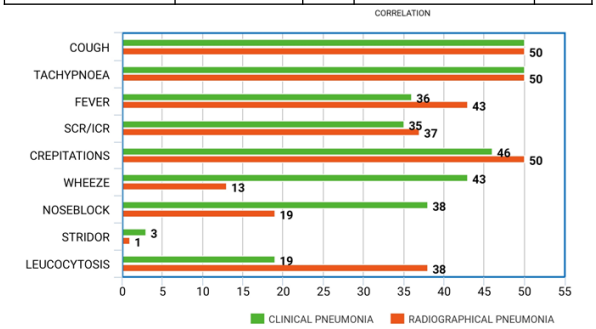
Children with respiratory failure Children who were intubated and ventilated Children requiring inotropic support

Children attending the out-patient department and who come under the study population during the study period were admitted and recruited in the study and informed verbal consent for participation was taken from the parents.

The detailed clinical evaluation of these subjects, done by a single observer was recorded on the proforma. Special emphasis was given to symptoms like cough, fever, nasal discharge, tachypnea, chest indrawing, and refusal of feeds. Physical examination done included the evaluation of radial pulse rate, heart rate, respiratory rate, axillary temperature recording, chest indrawing, nasal discharge, breath sounds with emphasis on added sounds, abdominal examination for hepatospleenomegaly. Investigative parameters evaluated in all the subjects include complete blood picture, chest x ray.

RESULTS:

FEATURES	CLINCAL PNEUMONIA	%	RADIOGRAPHICAL PNEUMONIA	%
AGE				
6-11 MONTHS	20	40%	23	46%
12-60 MONTHS	30	60%	27	54%
SEX				
MALE	29	58%	28	56%
FEMALE	21	42%	22	44%
CLINICAL FEATURES:				
COUGH	50	100	50	100%
TACHYPNOEA	50	100	50	100%
FEVER	36	72%	43	86%
SCR/ICR	35	70%	37	74%
CREPITATIONS	46	92%	50	100%
WHEEZE	43	86%	13	26%
NOSE BLOCK/ DISCHARGE	38	76%	19	38%
STRIDOR	3	6%	1	2%
LEUCOCYTOSIS	19	38%	38	76%



After the analysis of data, there wasn't much difference in the children in terms of age and sex. The list of clinical symptoms and signs that were seen in the children in decreasing order are as follows- cough, tachypnea, crepitations, all the children studied presented with cough and tachypnoea. Fever, and and the clinical presence of crepitations are higher in the radiographical group than the WHO classification group. The presence iof wheexe, nasal blockage and stridor were higher in the children with clinical pneumonia. When the lab parameters were evaluated, leucocytosis was significantly higher in patients with radiographically significant pneumonia than WHO recommended clinical pneumonia.

DISCUSSION:

Pneumonia is the leading cause of death in children worldwide in both developed and developing countries.Pneumonia has been a major cause of mortality in under five age group, accounting for 14.3% deaths in infancy and 15.9% during 1-5 years(6). Both bacteria and viruses can cause pneumonia. Bacterial pneumonia is often caused by streptococcus pneumoniae (pneumococcus) or haemophilus influenza mostly type b (Hib) and occasionally by staphylococcus aureus or other streptococcus. Just 8 to 12 of the many types of pneumococcous cause most cases of bacterial pneumonia although specific types may vary between adults and children and between geographic locations. Other pathogens such as mycoplasma pneumonia and chlamydia pneumonia cause atypical pneumonia(7).

Widespread use of vaccines against measles, diphtheria, pertussis, Hib, pneumococcus, and influenza have the potential to substantially reduce the incidence of ARIs in children in developing countries(8).

Pneumonia was mainly diagnosed by clinicians based on clinical findings and x-ray evidence(9).Majority of the children in developing countries do not have access to either a skilled person or to radiological investigations. By the time they reach either of these, it is too late for the child with many fold increase in risk of mortality. It was such a scenario that various clinical parameters were assessed by various group of researchers, age specific tachypnea was identified as the single most sensitive indicator of pneumonia(10).

The skill of simple counting of respiratory rate can be easily acquired by health care provider at primary health centre level. WHO developed algorithm for ARI management based on tachypnea, chest indrawing and danger signs. This WHO based protocol has been very effective in reducing mortality due to pneumonia. However tachypnea was not a specific indicator and could be due to other conditions like viral pneumonias and bronchiolitis and allergic airway disease etc(11).

Thus if tachypnea, which is a simple clinical parameter which can be easily practised in primary care settings can be redefined and temperature, again a simple clinical parameter which can be easily practised to identify bacterial pneumonias, it could cause a significant reduction in cost of management and over-use of antibiotics and better utilization of supportive therapy.Additionally, if lab support is available, leukocytosis with above clinical signs in a child can reasonably predict that the child is suffering from bacterial pneumonia(12).

It helps to know from the study that hyper-reactive airway disease can be differentiated from pneumonia, to a reasonable extent on the basis of clinical features like fever, RR, and simple investigation like leukocyte count. This may help in rational management with antibiotics, bronchodilators and steroids in these children. This study offers possibility of redefining the current algorithm by incorporating simple predictors that have potential application to the para-medical personnel. Our study indicates the need for initiating multi-centric trials in diverse settings to confirm or refute the findings.

This study also goes on to show that in the absense of radiological equipment, even clinal studies can be the basis for starting treatment.

CONCLUSION:

While radiological confirmation is preferred before diagnosing pneumonia, it is always advisable to look for leucocytosis before the initiation of antibiotics.

CONFLICT OF INTEREST: NONE
FINANCIAL SUPPORT: NONE

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