Original Article

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Efficacy of Oral Amoxilcillin in the Treatment of Non Community Acquire Pneumonia

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ABSTRACT

Objectives: To assess the efficacy of oral Amoxicillin in the treatment of Non-severe community acquired pneumonia in children 2-59 months of age, attending the Pediatric Emergency Department LUMHS, Hyderabad.
Study Design: Descriptive / Cross-Sectional Study.
Place and Duration of Study: This study was conducted at the Department of Pediatric Emergency LUMHS, Hyderabad, from November 2015 to May 2016.
Materials and Methods: A total of 80 children aged 2-59 months with signs of both fast breathing and chest in drawing were classified as pneumonia. Oxygen saturation and chest X ray were done in all cases. Treatment with Oral Amoxicillin 90mg/kg/day for 5 days was given and response to treatment was assessed on 3rd day of admission. Children who did not improve on 3rd day of admission were declared treatment failure and switched to 2nd line treatment.
Results: In this study overall 78.7% children improved with Oral Amoxicillin 90mg/kg/day BD for 5 days, while 16.3% children had treatment failure on Oral Amoxicillin. Treatment failure was more commonly seen in children with oxygen saturation <95% on admission. 5% children defaulted due to parents concerns.
Conclusion: Oral Amoxicillin is effective in 78.7 % children presenting with fast breathing and chest in drawing. Dissemination and Implementation of these findings will provide cost effective treatment and reduce burden on both government and private sector by reducing rates of admissions and prescription of costly antibiotics.

Key Words: Community acquired Pneumonia, Abnormal Chest X-ray.

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INTRODUCTION

Pneumonia in children is the leading cause of mortality aged less than 5 years; death caused by it is about 2.1 million per year in children less than 5 years old. In Pakistan every year 71,000 children die due to pneumonia.[1]

Most cases occur in India (43 million), China (21 million) and Pakistan (10 million). Of all community cases, 7–13% requires hospitalization due to its severity. [2]

According to WHO Pneumonia in children presenting with cough and difficult are classified as Pneumonia if they have fast breathing and/or chest in drawing. In children from 2-12 months, if the respiratory rate is above 50, than it is fast breathing, while in children 1-5 years old, respiratory rate above 40 is counted as fast breathing. According to severity there are two classifications of pneumonia; one is "pneumonia" with fast breathing and/or chest indrawing and other is "severe pneumonia", pneumonia with any general danger sign.[3]

Most common causes of Bacterial Pneumonia in children 2months to 5 yrs are Pneumococci H Influenza, ,Staphylococcus and Streptococcus while Atypical Pneumonia are also common caused by Chlamydia and Mycoplasma

For the conformation of Bacterial Pneumonia Chest X ray is useful while, laboratory markers like, C-reactive protein, white blood cell count, have limited use in the diagnosis of bacterial pneumonia.[5]

WHO has defined diagnostic criteria for the detection of radiological abnormalities in Chest X-rays. It has 4 categories 1. Significant Pathology, 2. End Point Consolidation, 3. Non end point infiltrates, 4. Pleural Effusion[17].

Oral administration of antibiotics is preferred for bacterial pneumonia. In severe Pneumonia Injectable Antibiotics are given because oral intake is not good in these children. 6For suspected Pneumococcal infections Oral Amoxicillin is given because its response is better against this bug, and this bug is common cause of Pneumonia in children less than 5 years old.

This study is done to see the efficacy of Oral Amoxicillin for the Treatment of Non Severe Community acquired Bacterial Pneumonia; hence it can be applied at the community level. By doing this we can prevent the injudicious use of 2nd line Injectable

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Antibiotics and can prevent the emerging resistant of bacteria.

MATERIALS AND METHODS

It was descriptive cross sectional study, carried out at the Department of Pediatrics, Liaquat University of Medical and Health Sciences Hyderabad on 80 patients of Pneumonia from November 2015 to May 2016. Permission was taken from institutional Ethical Committee and informed consent was taken from the parents of Children.

80 patients were dealt by non-probability, purposive technique. Data was entered and analyzed in SPSS version 22.0. Mean and standard deviation was calculated for numerical variables like age. Frequency and percentage was calculated for Outcome.

Inclusion Criteria: Children of either gender aged 2 months to 59 months who presented with Cough, Fever and difficulty in breathing with signs of both with fast breathing and Sub costal Recessions were included in the study.

Exclusion Criteria: Children having the sign of upper respiratory tract infections (Runny nose, red eyes, ear discharge and sneezing), were excluded from the study. Children having Cyanosis, Seizures, and Unable to feed or vomiting everything were also excluded from the study. Children with oxygen saturation less than 90% on admission

After detailed Physical Examination, Chest X ray was taken at the time of arrival. After that Children were admitted in Pediatric ward for the administration of Oral Amoxicillin (90mg/kg/day, BID), to confirm the compliance and to see the response of treatment.

Children were examined every 24 hourly for the presence of fever, fast breathing, chest in drawing and development of general danger signs. Those who were afebrile and having no fast breathing or chest indrawing on 3rd day of admission were discharged on Oral Amoxicillin to complete the 5 days of antibiotics at home and reassessed at Out Door Department. Those who continued to have fast breathing or chest in drawing on 3rd day of oral antibiotics were switched to Inj Ceftriaxone as a Second Line Antibiotics. Those who left the hospital before the 3rd day of admission or who insisted for early Injectable antibiotics were considered as defaulters.

Operational Definitions:

Fast Breathing: Age 2 – 12 months (Respiratory Rate 50 or above per minute), Age> 12 – 59 months (Respiratory Rate 40 or above per minute)

Significant Xray Pathology: Presence of consolidation, infiltration or effusion,

End point consolidation: A dense or fluffy opacity that occupies a portion or whole of a lobe or of the entire lung, that may or may contain air bronchograms,

Non end point infiltrate: Linear and patchy infiltrate in a lacy pattern involving both lungs, Pleural effusion: presence of fluid in lateral pleural space between lung and chest wall, this will be seen at the costophrenic angle or as a layer of fluid adjacent to lateral chest wall.

Non end point infiltrate:

Outcomes:1) Improved: No fever and no fast breathing or chest in drawing on 3rd day of admission, 2) Treatment Failure: Fast breathing or chest indrawing persisting at 3rd day of admission, 3) Defaulters: Insisted to start injectable 2nd line antibiotics within 3 days of admission or who left the hospital before 3rd day of admission.

RESULTS

There were total 80 children, 73.8% children were between 2-12 months old age group, while 26.2% children were among >12-59 months old age group. 62.7% children were male and 37.3% children were female among 2-12 months old age group, while 71.4% were male and 28.6% were female among >2-59 months old age group. Treatment failure was 15.3% among 2-12 months old age group, while 19% among >2-59 months old age group. Chest X ray was abnormal in 76.3% cases and treatment failure was present in 19.7% children.

In this study overall 78.7% children improved with Oral Amoxicillin 90mg/kg/day BD for 5 days, while 16.3% children had treatment failure on Oral Amoxicillin. 5% children were defaulted due to parents concerns.

Table No.1: Age Group and Gender N=80

Age Group	Male	Female	Total (%)	Treatment Failure	Mean (SD)	P Value
2 m-12m	37 (62.7%)	22(37.3 %)	59 (73.8%)	9 (15.3%)	6.525 (3.213)	<0.01
>12 - 59m	15 (71.4%)	6 (28.6%)	21 (26.2%)	4 (19.1%)	26.761 (9.894)	

Table No.2: Radiological Findings

Radiological Findings	**Frequency**	**Treatment Failure**	**Mean (SD)**	**P Value**
Abnormal Chest X Ray	61 (76.3%)	12 (19.7%)	0.3250 (0.4713)	<0.01
Significant Pathology	10	2 (20%)		
End Point Consolidation	0	0		
Non end point infiltrate	66	11 (16.6%)		
Pleural Effusion	0	0		

Table No.3: Oxygen Saturation

Oxygen Saturation	Frequency (%)	Treatment Failure
<90	0	0
90-95	44 (57.8)	11 (25%)
>95	32 (42.1)	2 (6.25%)

Table No.4 :Outcome

Outcome	Frequency	%	P Value
Improved	63	78.7	<0.002
Improved within 24 hours	54	85.7	
Improved between 24-48 hours	8	12.6	
Improved between 49-72 hours	1	1.58	
Treatment Failure	13	16.3	
Treatment failure having fast breathing	1	7.69	
Treatment failure having sub costal recessions	1	7.69	
Treatment Failure having both fast breathing and subcostal recessions	11	84.6	
Defaulted	4	5	

DISCUSSION

Though amoxicillin efficacy was documented clearly before recommendations were revised by experts for pneumonia in IMNCI, but studies in many countries have shown that almost half of physicians in hospitals prescribe inappropriate antibiotics and behavior change interventions are required to improve prescribing habits. One of the effective methods is to have a defined antibiotic policy in hospitals which has shown to improve such practices [18]. Pediatricians prescribing behaviors have documented in studies to be influenced by parental expectations which may be one of the reasons for inappropriate prescribing [19].

There should be rational use of antibiotics to reduce pneumonia-related mortality. WHO report shows that if we treat pneumonia properly with appropriate antibiotics, then we can save about 6 lac children from death each year[7]. There should be early diagnosis, proper antibiotics choice and monitoring in case of pneumonia management. Standard recommendations should be followed for desired results and continued periodical local efficacy studies are required to maintain confidence of practitioners. It is imperative that study results and standard protocols are disseminated to all prescribers in public and private to set up a common policy in all sectors for prevention of resistance in commonly used antibiotics.

General Practitioners are using antibiotics for viral upper respiratory tract infections, but there is no use of it. In the primary care Settings broad spectrum antibiotics are prescribed without any justification[8]. Most of the times parents don't complete the full course of the antibiotics and stop taking antibiotics once symptoms subsides, this causes the emergence of resistant bacteria's in the community.

15-40% Childhood Pneumonia is caused by viruses that should not be treated with antibiotics[9].

A study done in 2011 to see the different antibiotic use for pediatric infections including Pneumonia, it showed that Cefixime was prescribed to 10% children, Amoxicillin was prescribed to 10.7% children and Ciprofloxacin was prescribed to 4% children. Interestingly combination of multiple antibiotics were prescribed to 30% [10]

This study is done according to new classification of Pneumonia designed by WHO, in 2012. According to that there are 2 classifications of Pneumonia that is Pneumonia (Fast breathing and, or Sub costal Recessions) and Severe Pneumonia (Pneumonia with any general danger sign). The important thing in this study is that we chose children having Pneumonia, but having both fast breathing and Subcostal Recessions.

A similar study like our study was done in Pakistan in 2002. It was randomized controlled trial. A total of 725 children aged 2-59 months were treated with Oral Amoxicillin 50 mg/kg/day BD for 5 days for non-severe Pneumonia. Treatment failure was 16.1%, and it was more likely in infants who were ill for more than 3 days before treatment.[11] In our study we treated with Oral Amoxicillin 90mg/kg/day for 5 days, treatment failure rate was 16.3%.

Another randomizes study was done in Pakistan in 2008. Oral Amoxicillin 90mg/kg/day BD was given to 1025 children for 5 days, for Pneumonia to children aged 2-59 months old. Treatment failure was 7.5% [12]. This treatment failure was much less as compared to our study (16.3%), this might be due to selection criteria of children, because in 2008 there was old WHO classification of Pneumonia that was only children with fast breathing were defined as Pneumonia, while we took children according to New classification that is having fast breathing as well as subcostal recessions.

A cluster randomized controlled trial was done in Matyari district of rural Sindh, Pakistan from 2008-2010. Oral Amoxicillin 90mg/kg/day BD for 5 days was given to children aged 2-59 months old for Pneumonia. Treatment failure was 8% [13]

Different studies done in India showed the similar results. A randomized controlled trial was done in India in 2015 in children, aged 3-59 months having Pneumonia. Total 1118 children were treated with Oral Amoxicillin, out of them 554 were treated in hospital and 564 were treated at home. Treatment failure rate was 11.5% [14]. A controlled clinical trial was done in India in children aged below 5 years of age, for the treatment of community acquired pneumonia. Total 2208 children were treated with Oral Amoxicillin and treatment failure was 13% [15]. In contrast to our study more common age of treatment failure was 3-11 months, while in our study it was >12 -59 months.

A similar study was done in different countries all over the world. A randomized multi-center study was done at tertiary care hospitals of eight different countries. All

8 were developing countries. 857 children aged 3-59 months with Pneumonia were treated with Oral Amoxicillin for 5 days. Treatment failure was 19% [16]. Treatment failure was equal in both groups, that is Treatment with Oral Amoxicillin and Injectable Ampicillin, while in our study we treated children only with Oral Amoxicillin.

CONCLUSION

This study has a unique characteristic because it was done only in children having non severe pneumonia, but manifesting with both fast breathing and Chest indrawing. Treatment success in nearly 80% with oral Amoxicillin shows implementation of such cost effective policies can reduce mortality from pneumonia in primary health care.. Children having Bacterial Pneumonia with abnormal Chest Xray have no significant correlation with treatment failure. Children with Oxygen saturation < 95% were at high risk of treatment failure

Conflict of Interest: The study has no conflict of interest to declare by any author.

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