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Original Research Article

Comparison of different antibiotic treatment in children with community acquired pneumonia: a comparative study

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ABSTRACT

Background: community acquired pneumonia also known as CAP refers to pneumonia contracted by a person with little contact with the healthcare system. Narrow spectrum antibiotics are generally considered to be the first line of treatment however there is considerable concern about the emerging resistance among the usual CAP pathogens to the most commonly used antimicrobial agents. The objective of this study was comparison of different antibiotic treatment in children with community-acquired pneumonia.
Method: A total of 100 paediatric patients who were admitted to the Emergency Department of medical institution with suspicion of pneumonia were included in the study. All the patients will be divided broadly into two study groups with 50 patients in each group. Group 1 patients were given intravenous amoxiclav, while Group 2 received intravenous ceftriaxone.
Results: In present study subjects from, Group 1 i.e. amoxclav group 42% had fever, i.e. 24% were suffering from tachypnea and only 4% suffered from tachycardia and abnormal was found in 20/50 patients. Whereas in Group 2 - 60% were suffering from fever, 16/50 i.e. 32% has tacypnea, 3/50 i.e. 6% had tachycardia and 16/50 i.e. 32 had abnormal WBC. In present study abnormal WBC was found to be more in first group.
Conclusions: Ceftriaxone and amoxiclav can be used successfully in treatment of CAP.

Keywords: Antibiotics, Broad spectrum, CAP, Pneumonia

INTRODUCTION

Community-acquired pneumonia (CAP) is commonly described as an acute infection of the lung parenchyma acquired in the community. It is most commonly bacterial in nature and is associated with clinical and/or radiological evidence of consolidation of part or parts of one or both lungs. It is one of the most important serious infectious diseases, accounting for a considerable number of hospital admissions in children, accounting for >150000 hospitalizations each year in the United States.[1] While a myriad of microorganisms may cause CAP, in reality a relatively small number of pathogens predominate, in particular the bacteria, of which Streptococcus pneumonia (pneumococcus) is by far the most common.[2,3]

Pneumonia is the leading single cause of mortality in children aged less than five years, with an estimated incidence of 0.29 and 0.05 episodes per child-year in low-income and high-income countries, respectively.[4] A number of guidelines have been published worldwide, describing the optimal treatment of patients with CAP, with the aim of improving patient outcomes.[5] The PIDS/IDSA guideline recommended the empiric use of narrow-spectrum coverage with ampicillin or penicillin G for children hospitalized with uncomplicated CAP. Whereas some studies suggest that penicillins are as

effective as broad-spectrum antibiotics for empiric treatment of CAP due to *S. pneumonia*.[6] Some authors have suggested that second-generation cephalosporin (ceftriaxone) or a third-generation cephalosporin (cefotaxime or ceftriaxone) is somewhat more effective than either ampicillin or penicillin.[7,8]

So, we planned the present study to access the clinical course and outcome of children hospitalized with CAP in the Paediatric Department and compare the efficacy of intravenous amoxiclav with ceftriaxone.

METHODS

A Prospective study was planned. 100 paediatric patients who were admitted to the Emergency Department of medical institution with clinical diagnosis of Pneumonia were selected for the study.

Study period was from May 2018 to July 2018. Patients aged below 5 years were included in this study. Both males as well as females were selected for the study. Patients guardians/parents were informed and explained about the purpose and procedure of the study. Ethical committee clearance was obtained prior to the study. A written informed content was obtained from the patient.

Inclusion criteria

- Patients with CAP
- Patients less than 5 years of age

Exclusion Criteria

- Patients with chronic disease
- Patients receiving antibiotic treatment immediately prior to admission,
- children with complicated pneumonia at any point during their hospital stay.

Data from in-patient hospitalization, symptoms on presentation, physical examination at presentation, laboratory and microbiologic indices, and treatment will be reviewed. Outcome variables included duration of fever, number of days of oxygen treatment, duration of total IV antibiotic therapy, treatment failure (defined as change of antibiotic therapy), and duration of hospital stay. All the patients were divided broadly into two study groups with 50 patients in each group.

- Group 1 included patients who received intravenous amoxiclav,
- Group 2 included patients who received intravenous ceftriaxone.

Statistical analysis

All the results will be analysed by SPSS software version 17.0. Chi- square test and student t test will be used for assessment of level of significance. P-value of less than 0.05 will be taken as significant.

RESULTS

A total of 100 patients with CAP were included in the current study: Group 1 50/100 (50%) received amoxclav and 50/100 (50%) received ceftriaxone (Table 1).

Table 1: Distribution of sample.

Groups	No. of patients
Amoxiclav	50
Ceftriaxone	50
Total	N = 100

Table 2: Clinical characteristics of patients.

Characteristics	Group 1 N = 50	%	Group 2 N = 50	%
Fever	21	42	30	60
Tachypnea	12	24	16	32
Tachycardia	2	4	3	6
Abnormal WBC	20	40	16	32

No difference was found between two groups in respect to gender, age, asthma, reactive airway disease, or viral lower respiratory tract infection. In present study subjects from, Group 1 i.e. amoxiclav group 21/50 i.e. 42% had fever, 12/50 i.e. 24% were suffering from Tachypnea, 2/50 i.e. 4% suffered from tachycardia and abnormal WBC was found in 20/50 patients.

Whereas in Group 2 - 30/50 patients i.e. 60% were suffering, 16/50 i.e. 32% has tacypnea, 3/50 i.e. 6% had tachycardia and 16/50 i.e. 32 had abnormal WBC. In present study abnormal WBC was found to be more in first group (Table 2).

Table 3: Variable outcomes observed.

Variables	Group 1	Group 2
Duration of fever	6.2 (5-8)	8.9 (7-12)
Tachypnea	15.8	0.1221
Tachycardia	4.1 (14-22)	5.2 (18-30)
Abnormal WBC	6.8 (5-10)	7.6 (6-12)

In current study we found that there was significant variation in initial therapy choice across hospitals; the rate of narrow-spectrum use ranged from 18.8% to 90.2% (P <0.001).

Based on results of present study there was no significant difference in duration of oxygen, duration of fever, or readmission rate within 7 days. However, hospital stay was found to be longer in Group 2 as compared to Group 1 (Table 3).

DISCUSSION

Definitions of pneumonia vary widely. Some require only the presence of infiltrates on a chest radiograph, whereas others require only certain respiratory symptoms or signs. The World Health Organization has defined pneumonia solely on the basis of clinical findings obtained by visual inspection and timing of the respiratory rate.

Definitions are a particular problem in the case of small infants, since pneumonia and bronchiolitis are both common in this age group, and the features of these two diseases often overlap.

CAP is associated with a considerable burden of disease in most regions of the world. It is estimated that a total of around 156 million new episodes occur each year and most of these occur in India (43 million).[4]

Interestingly, while it is well described that pneumococcal infections commonly complicate both seasonal and pandemic influenza infections, more recently it was documented that the pneumococcus was a common bacterial co infection in patients with influenza A H1N1 infection who were admitted to hospital with CAP.[9] There is considerable concern about the emerging resistance among the usual CAP pathogens to the most commonly used antimicrobial agents.

In present study we compared amoxclav therapy to ceftriaxone therapy for children hospitalized with CAP. In this study, we found that both antibiotics in all measured outcomes including like duration of oxygen, duration of fever, daily standardized pharmacy and readmission rates within 7 days were equal.

Results of the present study are in support of Gotfried MH who recommended the empiric use of amoxclav in CAP of hospitalized pediatric patients.[10]

Balgos AA et al in their study concluded that amoxycillin/clavulanate 875/125 mg twice daily is as effective as amoxycillin/clavulanate 500/125 mg three times daily for the treatment of community-acquired lower respiratory tract infections and could improve patient compliance.[11]

However, Martin_M et al in their study suggested that first-line treatment of CAP patients with moxifloxacin followed by co-amoxiclav or hospitalisation if required was more effective and less costly as compared with first-line treatment with co-amoxiclav, ceftriaxone or clarithromycin.[12]

CONCLUSION

Within the limitations of the present study we found that amoxclav and ceftriaxone are equally effective in children suffering from CAP. Amoxclav can be easily used in uncomplicated case of CAP.[13] No complications were observed in present study and readmission rate was found almost negligible.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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