

**Original Research Article****Comparative efficacy of Amoxicillin Vs Cefixime in the treatment of Childhood enteric fever in a tertiary level Hospital in Bangladesh**

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**Dr Md. Nazmul Hassan**Department of Paediatric Gastroenterology & Nutrition,  
Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh**Abstract**

*The study aims to assess the clinical efficacy of amoxicillin in comparison to cefixime in the treatment of childhood typhoid fever and to reduce morbidity and mortality from typhoid fever. This was an age and sex matched interventional study on inpatient and outpatients children of below 14 years of pediatrics department of Rangpur Medical College Hospital, Bangladesh from September 2013 to February 2014. A total 60 child diagnosed with typhoid fever was evaluated in this study. Male-female ratio was 1.31:1.0, most of them in between 1 to 5 years of age. Majority of patients (58.3%) were normal or mildly wasted. In most cases fever was continued (63.3%) in nature followed by intermittent (36.6%) in nature. Cure was achieved in amoxicillin and in cefixime group 73.3% and 83.3% respectively. Differences between two groups were not statistically significant. There was no significant difference between two groups in respect of cure rate and defervescence period. Also there was no serious adverse effect were found between two groups. Amoxicillin is effective and safe drug in the treatment of childhood enteric fever. Its efficacy is comparable with that of cefixime.*

**Keywords:** Enteric fever, Typhoid fever, Oral drugs for enteric fever.**Introduction**

Typhoid fever continues to be a global health problem causing enormous morbidity and mortality in developing country. In low- and middle-income countries it remains a significant health burden and it was estimated that typhoid

fever episodes in 2010 was 13.5 million (interquartile range 9.1–17.8 million) globally.<sup>[1]</sup> More than 90% typhoid fever cases are estimated to occur in Asian region and also it is a common febrile illness in Bangladesh.<sup>[2]</sup> A survey of enteric fever in a slum of Dhaka reveals an overall

incidence of 3.9 cases per 1000 population per year and in children less than 5 years of age, the rate is 18.7 per 1000 children per year.<sup>[3]</sup> It is endemic in developed countries like Bangladesh due to poor sanitation and poor standards of personal hygiene. But available treatment option faces some inconveniences like increasing multidrug resistant strains of *S. typhi*, high therapeutic cost, difficulty in drug administration and safety profile in pediatric population. So, availability of an oral option drug that is effective, safe and less costly is desirable.<sup>[4]</sup> Introduction of chloramphenicol in 1948 heralded the era of modern treatment of typhoid fever and the drug that had been the mainstay of therapy for the last four decades.<sup>[5]</sup> Most cases of typhoid fever could be effectively managed by chloramphenicol, amoxicillin, ampicillin or cotrimoxazole.<sup>[6]</sup> Antibiotics were selected empirically from the four conventional antibiotics, i. e, ampicillin, amoxicillin, cotrimoxazole and chloramphenicol for the treatment of enteric fever.<sup>[7]</sup> In recent years strains of *S. typhi* resistant to the three major orally administer antibiotic i, e, ampicillin, cotrimoxazole and chloramphenicol have been of major public health concern.<sup>[8,9]</sup> Chloramphenicol resistant *S. typhi* was first reported in 1950 and first case of chloramphenicol resistance in Bangladesh was documented in 1982.<sup>[4]</sup> In 1992, ICDDR, B found that 44% strains of *S. typhi* were resistant to three first line drugs.<sup>[10]</sup> Drug resistances are transferable and plasmid mediated.<sup>[11]</sup> Third generation cephalosporin and quinolone derivatives are found to be effective against MDR strains of *S. typhi*.<sup>[8,9,12]</sup> Emergence of quinolone resistant strain of *S. typhi* also reported. <sup>[12,13]</sup> Major limitation of third generation cephalosporin is their high cost and need for parenteral administration. Cefixime, an oral third generation cephalosporin has been claimed to have good antibacterial activity against Enterobacteriaceae including salmonella typhi. Ceftriaxone and oral cefixime have shown that they are similarly effective against MDR typhoid fever.<sup>[9]</sup> Recent clinical study has shown that excellent efficacy of

cefixime for the treatment of typhoid fever and it is also a safe, effective and oral option drug for the treatment of MDR enteric fever. But it is also a costly and newer drug.<sup>[14]</sup> Amoxicillin is a safe, less costly oral option drug and it was effectively used against typhoid fever and then became resistant to MDR strain of *S. typhi*.<sup>[15]</sup> But more recently it seems to be effective in Rangpur region against *S. typhi* and several report of decreasing trend of MDR strain of *S. typhi* in Bangladesh support this practical experience.<sup>[16]</sup> So, Amoxicillin could be a better option for the treatment of childhood enteric fever.

### Methods

**Place of Study:** Pediatrics inpatient and outpatients department of Rangpur Medical College Hospital. Duration of study: From September 2013 to February 2014.

**Study Design:** Age and sex matched interventional study.

**Study Population:** 86 cases (70 from inpatient and 16 from outpatient department) were initially enrolled in the study on the basis of inclusion and exclusion criteria. Inclusion criteria were: (1) Age <14 years (2) Documented fever for more than 5 days (3) Did not take any antibiotic. Exclusion criteria were: (1) Presence of clinical features suggestive of other febrile illness like pneumonia, Meningitis, Malaria etc. (2) Already having some antibiotic (3) Desperately ill necessitates immediate intervention (4) Unable to take oral medicine (5) Refusal of the parents to enroll their child in the study. After laboratory evaluation 66 cases were enrolled for treatment. Of these 66 cases 6 did not continue treatment and follow up. SO, finally 60 patients remained for completion of the study.

**Diagnostic Criteria:** Characteristic clinical feature with Widal test (TO) > 1/160 Or Positive blood culture Or Both.

**Procedure:** After taking written consent of the parent/patient, detail history was taken and physical examination was done. Cardinal features of history were taken and physical examinations

were noted in pre-tested questionnaire form. Blood sample were taken for CBC, widal test and blood culture. All investigations were done in clinical pathology department and the department of Microbiology, Rangpur Medical College. Widal test was done by slide agglutination tube method using commercial kit. Blood culture was done by lytic method in Mackonky agar media. Patient who had fulfilled the diagnostic criteria were finally enrolled in this study. They were divided into two group, group A and group B. Both groups were matched with each other as regards to age, Sex and nutrition. Only then treatments were given. Group A patient (34) were treated by amoxycillin 100mg/kg/day in divided doses and group B patient (32) were treated by cefixime 20mg/kg/day in divided doses. Four patients from group A and two patients from group B did not continue treatment. Finally total 60 patient (group A=30 and group B=30) were evaluated.

We followed up the study subjects daily and clinical response were evaluated by taking temperature record, assessment of appetite and general well-being and alleviation of symptoms and signs. Clinical improvement was defined by: (a) Gradual declining of temperature (b) improving appetite (c) improving general well-being (d) alleviating symptoms and signs. Response to treatment was recorded as clinical cure or treatment failure.

Clinical cure was defined as patient remaining afebrile for  $\geq 5$  days along with improvement of appetite and general well-being.

Treatment failure was defined as failure to improvement of clinical condition after 5 days of adequate antibiotic treatment.

**Data Collection and Analysis:** Data were collected in a preformed data collection form and analyzed in SPSS software. Results were expressed in table. P value of  $< 0.05$  was considered statistically significant.

### Result

Among 60 patients, most of the patient (45%) belongs to age group between 1 to 5 years and there were no patients below the age of 1 year. [Table 1] There were slightly male predominance seen 56.6% were boy and 43.4% were girl. [Table 2] Most of them belong to low income group (36.6%) and in middle income group were (36.6%). Regarding nutritional status of the study populations, majority of patients (58.3%) were normal or mildly wasted. [Table 3] In 36.6% cases, fever was intermittent in nature and (63.3%) was continued in nature. [Table 4] Table-5 showed that 73.3% cure rate in amoxycillin group and 83.3% cure rate in cefixime group. Differences between two groups were not statistically significant. Table-6 showed that defervescence period of amoxycillin group was ( $4.64 \pm 1.4$ ) and cefixime group ( $4.24 \pm 1.13$ ). There was no significant difference between two groups ( $P=0.54$ ). Table-7 showed that no serious adverse effect were found except loose motion in three cases in Amoxycillin group and two nausea and one vomiting cases in cefixime group.

**Table 1:** Number and percentage of patients by age in years (N=60)

Age in year	Group		Total (%)
	Amoxycillin	Cefixime	
<1 year	0	0	
$\geq 1$ to 5 years	12	15	27 (45)
$\geq 5$ to 10 years	14	12	26 (43.3)
>10 to 14 years	4	3	7 (11.6)
Total	30	30	60 (100)

**Table 2:** Number and percentage of patients by sex (no- 60)

Sex	Group		Total (%)
	Amoxycillin	Cefixime	
Male	18	16	34(56.6)
Female	12	14	26(43.3)
Total (%)	30 (50)	30 (50)	60(100)

**Table 3:** Nutritional status of study population (n=60)

Weight for height Z score	Group		Total (%)
	Amoxycillin	Cefixime	
WHZ> -2	18	17	35 (58.3)
WHZ= -2 to -3	8	7	15 (25)
WHZ= < -3	4	6	10 (16.6)
Total	30	30	60(100)

**Table 4:** Number and percent of patents by type of fever in both group

Type of fever	Group		Percentage
	Amoxycillin	Cefixime	
Continued	20	18	38(63.3)
Intermittent	10	12	22(36.6)
Total	30	24	100

**Table 5:** Outcome of study population by groups of antibiotics (n=60)

Group of antibiotics	Outcome		Total	p-value
	Cure	Failure		
Amoxycillin	22(73.3%)	8(26.6%)	30	>0.05
Cefixime	25(83.3%)	5(16.6%)	30	

**Table 6:** Comparison of defervescence period in two-treatment group

Group	Defervescence in days Mean $\pm$ SD	p-value
Amoxycillin	4.63 $\pm$ 1.39	0.54
Cefixime	4.24 $\pm$ 1.12	

**Table 7:** Comparison of adverse effect between two groups

Adverse effect	Group	
	Amoxycillin	Cefixime
Loose motion	3	0
Nausea	0	2
Vomiting	0	1
GI bleeding	0	0
Typhoid psychosis	0	0

## Discussion

In this study an attempt was made to evaluate comparative efficacy of amoxycillin with that of cefixime in the treatment of childhood enteric fever.

Both groups of patients were matched as regards to age, sex, nutrition status and socioeconomic condition of the patient. In this studies incidence of typhoid fever was nil before the age of 1 year. High incidence (45%) was found in the age group

of 1 to 5 years (Table-1). Our observation is similar to that of Sinha et al.<sup>[17]</sup> The probable explanation of lower incidence in less than 1 year of age is that they are less exposed to external environment and maternal antibody might have played role in endemic areas like Bangladesh.

In the present study (Table-2), there was male preponderance. Male dominance was also found in several other studies at home and abroad.<sup>[18]</sup> Males are more cared in our society and this may

be one of the causes of male preponderance. Most of patients come from low socioeconomic class. Their per capita income per month were <1000/month.

In the present study fever was the most constant symptoms (100%). It was continued in 63.4% and fluctuating in 36.6% cases (Table-5). This finding is similar to that of Singh et al.<sup>[19]</sup>

The efficacy of the drug was assessed in terms of defervescence as well as clinical cure of the study population. Cure rate was 83.3% in cefixime group and 73.3% in amoxicillin group (Table-6). Bhutta Z.A et al have shown that ceftriaxone and oral cefixime are similarly effective against MDR typhoid fever.<sup>[9]</sup> Some study showed Amoxicillin is significantly superior to chloramphenicol.<sup>[20]</sup> Cure rate of childhood enteric fever by amoxicillin was comparable with that of cefixime in our study ( $P>0.05$ ). There was no significant deference in defervescence period between two groups of study population (Table-7). No serious adverse effect was noted related to drugs except nausea, vomiting and loose motion (Table-8).

### Conclusion

Amoxicillin is effective and safe drug in the treatment of childhood enteric fever. Its efficacy is comparable with that of cefixime. So, considering the economy of our population we can recommend amoxicillin in the treatment of childhood enteric fever.

### Limitation

It is a small size study. Further study is needed to support this observation.

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### Conflict of interest

The authors declare no conflict of interest.

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