

“Treatment of Enteric Fever in Children Comparison of Efficaciousness of Ciprofloxacin with Ceftriaxone: A Study in Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh”

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Abstract

Original Research Article

Aim and Objective: To match the clinical effectualness of ciprofloxacin vs ceftriaxone in terms of the proportion of Children turning into symptom in ninety six hours. Study Design: Randomized controlled style study. Place and length of Study: Department of Pediatrics, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh from March 2017 to September 2017. Methodology: 88 Children UN agency consummated the clinical criteria of getting typhoid were enclosed within the study. They came to the indoor and out of doors of the department. Forty four patients were treated with injectable Cipro, whereas 44 were treated with injectable ceftriaxone. Results: The study enclosed 88 patients with feverish malady UN agency were suspected of getting typhoid. The mean age was 8.3 ± 1.94 years and 41 (46.6%) were males. The mean weight was 24.7 ± 6.3 kg. Only fifteen (17%) used stewed water as a routine. 68 (77.3%) Children in total became symptom inside 96 hours and twenty (22.7%) did not become symptom in 96 hours. within the Cipro cluster, 25 (56.8%) patients became symptom in ninety six hours and nineteen (43.1%) did not become symptom in ninety six hours. within the ceftriaxone cluster, 43 (97.7%) patients became symptom in ninety six hours and one (2.3%) did not become symptom in ninety six hours. The proportion of patients turning into symptom inside ninety six hours was considerably higher within the ceftriaxone cluster as compared to the Cipro cluster, $p = 0.00$. Conclusion: ceftriaxone is simpler in Children with typhoid in terms of bigger proportion of Children turning into symptom in ninety six hours.

Keywords: Typhoid Fever, Ceftriaxone, Efficacy of drug.

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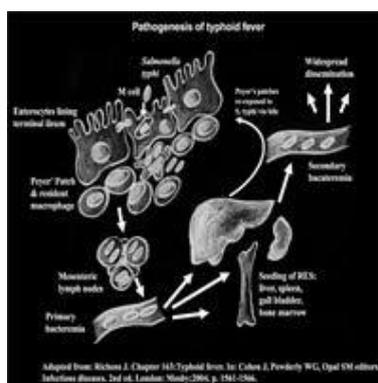
INTRODUCTION

Typhoid fever, a communicable disease caused by the bacteria *Salmonella typhoid*, has been a major cause of significant morbidity and mortality since antiquity [1]. *Salmonellae* are important gram-negative bacilli which cause a spectrum of characteristic clinical syndromes including gastroenteritis, enteric fever, bacteremia, endovascular infections, and focal infections such as osteomyelitis or abscesses [2]. Enteric fever, also called typhoid fever or paratyphoid fever, is a systemic febrile illness that is most commonly caused by *Salmonella typhi*. Less frequently, it is caused by *S. paratyphi A*, *S. typhi B*, and *S. paratyphi C* [3-6]. Even "nontyphoidal" *Salmonellae*

may cause severe illness which is consistent with enteric fever. Complications are more common in untreated individuals and they include intestinal hemorrhage and perforation, or focal infection such as visceral abscesses. Within the preantibiotic era, or so V-day of afflicted people died, with survivors experiencing a chronic sickness lasting weeks and exhaustion often-lasting months. What is more, or so 10 percent of untreated people relapse, whereas one to four-dimensional becomes chronic carriers of the organism. East Pakistan has the fourth highest incidence rate of infectious disease occurring within the general population, worldwide. Enteric fever could be a common presentation in paediatric clinics [7,8]. Within the western world, the illness is near to wipeout levels.

However, globally, there are a minimum of thirteen to seventeen million cases leading to 600000 deaths. Enteric fever represents the fourth most typical explanation for death in East Pakistan. It's transmitted by feculent oral root and by contamination of food and water. World Health Organization identifies infectious disease as a heavy public pathological state [9, 10]. Its incidence is highest in youngsters and young adults between 5-19 years previous. United Nations agency (Worth Health Organization) showed that the incidence of enteric fever in Bangladesi youngsters aged 2-5 years was 573.2 per 100,000 person's p.a. Also, similar incidence was seen in class going youngsters and adolescents. The very best burden of illness is in youngsters aged 2-15 years [11-15]. Therefore, S Typhi

represents the most common explanation for bacteraemia during this cohort, and annual infectious disease rates (confirmed by blood culture) in recent studies from India, Bangladesh, and Indonesia vary from 149 to as high as 573 cases per 100 000 Children. The definitive diagnosis of typhoid fever is made only on isolation of salmonella typhi from blood, stool, urine, bone marrow etc, in the presence of characteristics clinical features. The case fatality ratio is 10% in the absence of treatment, and less than 1% with the use of antibiotics. Fluroquinolones i.e. Ciprofloxacin, are recommended as 1st line therapy for children and adults infected with sensitive as well as multidrug resistance, S. Typhi and paratyphi.



Source: Google

Third generation cephalosporins i.e. Ceftriaxone, is also useful but their use is reserved for complicated cases Multidrug resistance (resistance to chloramphenicol, ampicillin, and co-trimoxazole) sequentially increased from 34% in 1999 to 66% in 2005. In a prospective study in North India, there was a gradual development of resistance to fluoroquinolones over the past 7 years[16]. No resistance was ascertained to fluoroquinolones in 1999, whereas in 2005, 4.4% resistance was ascertained to sparfloxacin, 8.8% resistance to ofloxacin, and a high resistance, 13%, to antibiotic drug. Keeping in mind drug resistance within the community, it will be questioned that either of those medication have distinction in effectualness in terms of sensitivity and resistance pattern and relapse. In addition, we plan to conduct a study to find out the clinical response in children with typhoid fever treated with ciprofloxacin vs ceftriaxone. Thus, the results of the study will enable paediatricians to choose the first line therapy for the treatment of enteric fever in similar setting. In this way, timely management of these children will reduce morbidity specifically and also reduce the burden on hospital clinics in general [17].

METHODOLOGY

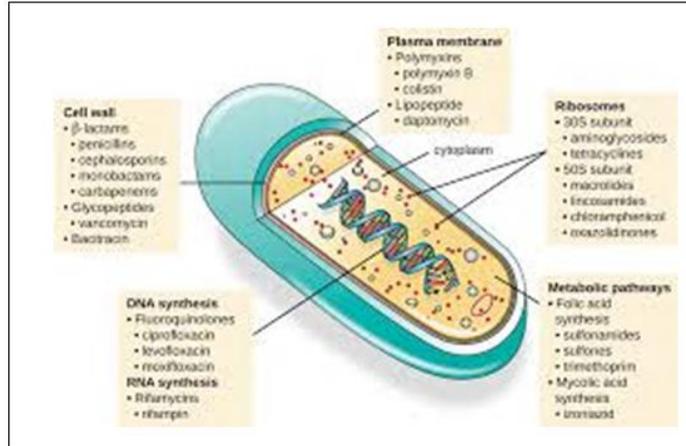
The study was conducted at Pediatric Department, Dhaka Shishu (Children) Hospital, and Bangladesh. Study was conducted over six months from 25th March 2017 to 24th September 2017. A total of 88

patients with clinical identification of enteric fever were enclosed within the study. 44 patients were treated with ciprofloxacin (Ciprofloxacin group), while 44 were treated with ceftriaxone (Ceftriaxone group).

Consecutive (non-probability) Sampling Technique

Children 5-12 years previous of each sexes having enteric fever were enclosed within the study. All those having current history of intake of oral or I/V antibiotics (third generation cephalosporins and quinolones) and absence of fever at the time of presentation were excluded. However, this was a case control study. Patients fulfilling the study criteria were admitted in the pediatric ward of Dhaka Shishu (Children) Hospital and were randomly divided into two groups, A and B, based on random numbers[18]. Group A was given Inj. Ciprofloxacin 10mg/kg I/V twice daily, while group B was given Inj. Ceftriaxone 70mg/kg I/V once daily for 7 days. Each teams were determined for the length of turning into afebrile (96hrs). The investigation to be done throughout hospital keep was typhidot (IgM antibodies) from the selected laboratory with the quality Child. However, the results were verified by the consultant pathologist. Data was analyzed using SPSS (V10). Mean and standard deviation were calculated for quantitative variables i.e. age and duration of getting afebrile. Frequencies and percentages were calculated for qualitative variables i.e. gender and getting afebrile in 96 hours. Consequently, chi-square test was used to compare the efficacy

(afebrile in 96hours) of both drugs. P-value < 0.05 was considered significant[19].



Antibiotic Drug Circulation system
Source: Google

RESULTS

The study enclosed 88 patients with feverish malady suspected of getting infectious disease on clinical grounds. Clinically, the patients had fever >37°C in the presence of at least one or more of the following sign and symptoms: Persistent headache, Abdominal pain or discomfort, Presence of splenomegaly/hepatomegaly, Rose spots on skin, vomiting, and no evidence of chest bowel urine or

meningeal infection. Thus, all subjects were 12 years of age. The age range was from 5 to 12 years with a mean age of 8.3±1.94 years [13]. 41 (46.6%) were males and 47 (53.4%) were females. The weight of the children ranged from 14 to 41 kg with a mean weight of 24.7±6.3 kg. Furthermore, 15 (17%) used boiled water as a routine, while 73 (83%) used unboiled water as a routine.

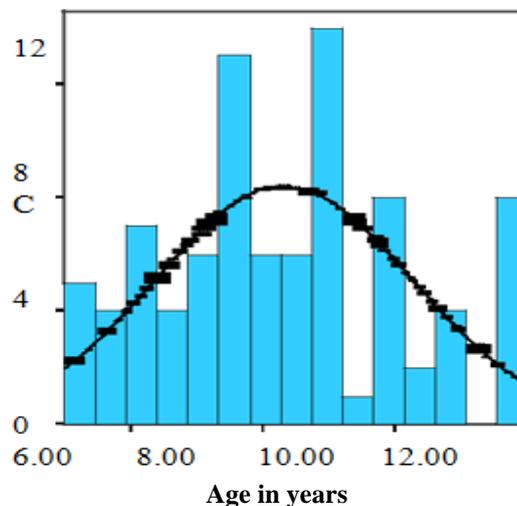


Fig-1: Histogram Showing Age Distribution of Study Group

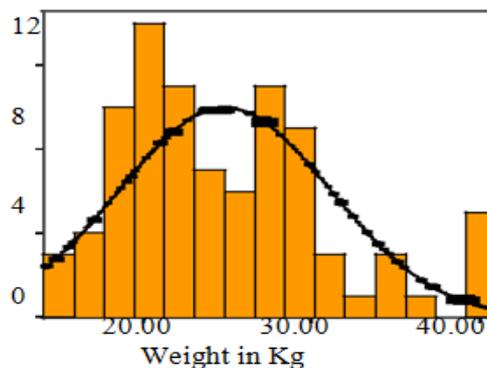


Fig-2: Histogram Showing Weight Distribution of Study Group

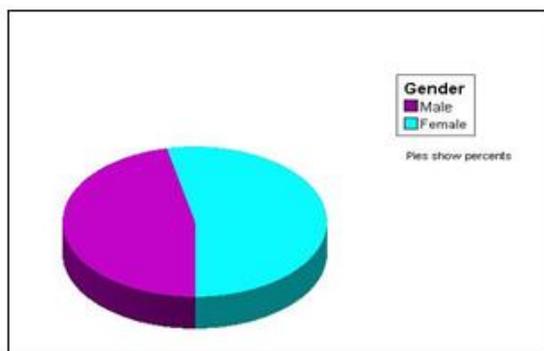


Fig-3:63.6%Pie Graph Showing Gender Distribution of Study Group 53.4.

Table-1: Gender Distribution in Study Groups (n=88).

Gender	Ciprofloxacin	Ceftriaxone
Male	24 (54.5%)	17 (38.6%)
Female	20 (45.5%)	27 (61.4%)
Total	44 (100%)	44(100%)

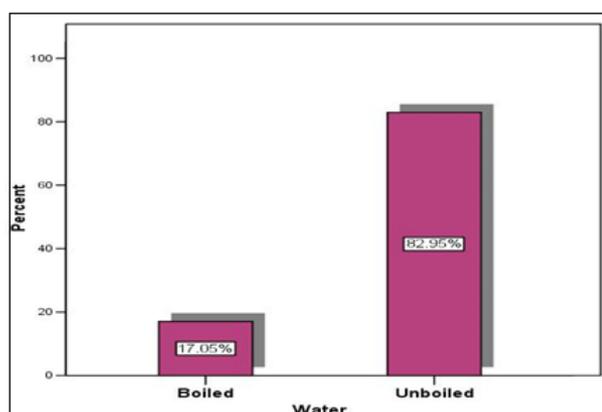


Fig-4: Water used Boiled and Non-boiled

Table-2: Chi square test comparing the frequency of patients becoming afebrile in 96 hours; ciprofloxacin versus ceftriaxone groups (n=88)

		Antibiotic group		Total		
		Ciprofloxacin	Ceftriaxone			
Afebrile in 96 hours	Yes	25	43	68	83%	
	No	19	1	20	17%	
Total		44	44	88		
		Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)		
Pearson Chi-Square	Value	Df				
Continuity Correction(a)	18.700	1	.000			
Likelihood Ratio	24.607	1	.000			
Fisher's Exact Test				.000	.000	
N of Valid Cases	88					

Chi-Square Tests

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.00.

DISCUSSION

Enteric fever may be a common health problem of kids and young adults. This magnifies the socio-economic impact of the sickness on the community. The industrialised and additional prosperous countries have, to a good extent, controlled this health problem by up standards of public health; however the sickness continues to be a significant public unhealthiness in less developed countries as well as Asian nation. Therefore, the emergence of drug resistant strains of enterobacteria has created the treatment of typhoid fever harder. The last a pair of decades have conjointly witnessed the looks and unfold of multidrug-resistant (MDR) strains of *S. typhi*. Infection with these strains is related to longer period of health problem and better morbidity and mortality. Thus, it's occurring at higher incidence throughout South Asia than antecedently thought notably in younger youngsters. Typhoid fever may be a vital downside within the educational institution years. Among youngsters, hour of cases are within the age bracket of five to nine years, twenty seventh between 2-5 years, and thirteen between age brackets of 0-2 years[15]. Once the emergence of antibiotic resistant *Salmonella typhosa* strains, Cipro has become the selection of medication for the treatment of infectious disease even within the medicine age bracket. The current study was disbursed to match the clinical effectuality of Ciprovs cephalosporin in terms of the typical time taken within the variety of days for defevescence within the treatment of infectious disease in youngsters. Therefore, the study enclosed eighty eight patients with febrile health problem suspected of getting infectious disease. The mean age was 8.3 ± 1.94 years and forty one (46.6%) were males. The mean weight was 24.7 ± 6.3 kg. solely fifteen (17%) used poached water as a routine. 68 (77.3%) youngsters in total became afebrile inside 96 hours, whereas twenty (22.7%) didn't become afebrile in ninety six hours. within the Cipro cluster, 25 (56.8%) patients became afebrile in ninety six hours and nineteen (43.1%) didn't become afebrile in ninety six hours. within the cephalosporin cluster, 43 (97.7%) patients became afebrile in 96 hours and one (2.3%) didn't become afebrile in ninety six hours. Therefore, the proportion of patients turning into afebrile inside ninety six hours was considerably higher within the cephalosporin cluster as compared to the Cipro cluster, $p = 0.00$. Our results so take issue from those of previous review, an outline of irregular controlled trials of typhoid fever that found fluoroquinolones to be superior to cephalosporin for clinical failure and fever clearance times. Though these knowledge recommend that fluoroquinolones had considerably lower fever clearance times compared with antibiotic, cefixime, and cephalosporin, the analyses of fever clearance times should be understood with caution. The mean fever clearance times usually follow a skew distribution—although most patients clear fever quickly, some take for much longer times, therefore meta analyses conducted mistreatment

arithmetic suggests that might not be correct. However, the persistence of fever in some patients despite apparent clearance of *S Typhi* and *S Paratyphi* from the blood has been attributed to the continued production of pyrogenic cytokines[16]. This means that point taken to clear fever might not be associate degree adequate live of antibiotic effectuality. Consequently, they will not be associate degree acceptable finish purpose in infectious disease medical care trials. Some investigators conjointly failed to specify whether or not clinical failures were excluded or enclosed within the calculations of mean fever clearance time. This might result to the irrational use of quinolones even in minor infections. Hence, most of this includes infectious agent fevers. This has resulted in increasing the resistance of *S typhi* to quinolones in our country. Acceptable treatment for typhoid fever may be a clinical and public health challenge, with rising levels of drug resistance and restricted proof for the utilization of newer agents, notably for youngsters. Large, simple, and methodologically rigorous trials ar required to match fluoroquinolones with 1st line antibiotics in community or patient settings. Hence, this reflects apply in low financial gain countries, with correct reportage of resistance knowledge. Long run follow-up and watching of adverse effects also are needed. Investigators should standardize definitions and time points of measurements of outcomes, notably those with a subjective nature, like clinical failure. Additionally to objective studies of treatment effectuality and price effectiveness, we'd like the evaluations of algorithmic approaches within the designation and management of prolonged fever in youngsters in regions wherever infectious disease is endemic. Such protocols can guide antibiotic use and should curb rising resistance. A study at the Divisions of Clinical medication, National Institute of infectious disease & Enteric Diseases (ICMR), Kolkata, India, evaluated the role of cephalosporin medical care in bacteriologically confirmed MDR infectious disease cases UN agency failed to answer 12-14 days of Cipro medical care. Makes an attempt have conjointly been created to research the in vitro status of isolated *S. typhi* strains to antibiotic, Cipro, and cephalosporin. a complete of a hundred and forty youngsters, aged 3- ten years, clinically diagnosed as having infectious disease, with none clinical response once 12-14 days of Cipro medical care were screened for *S. typhi* by blood culture. Within the bacteriologically positive youngsters, the treatment was modified to endovenous cephalosporin for fourteen days. The isolated strains of *S*[17]. *typhi* were tested for in vitro antimicrobial standing. Clinical and medication cure resolve with vas ceftriaxone treatment altogether the thirty 2 bacteriologically positive patients. All isolated *S. typhi* strains were uniformly (100%) prone to antibacterial drug and ceftriaxone. Thus, fifty p.c of the strains were proof against chloramphenicol. The MIC values of chloramphenicol, antibacterial drug, and ceftriaxone ranged between 125500, 0.0625-0.5 and < zero.0625

microgram/ml, severally. The study indicates that although the *S. typhi* strains were prone to antibacterial drug in vitro, the patients didn't respond clinically and bacteriologically to antibacterial drug treatment. Hence, antibacterial drug may not represent a reliable and useful chance for treating MDR communicable disease fever; thus, ceftriaxone might even be associate degree economical completely different for the treatment of such cases communicable disease is wide rife in developing countries, with Associate in Nursing annual burden of a lot of cases globally. At analysis Institute Hospital, Dhaka, a study on drug resistance in typhoid fever was administered in pediatric "A" Unit In total, fifty patients had positive culture for enterobacteria (blood in twenty six patients and bone marrow in forty nine patients). Organism isolated were typhoid bacillus in forty nine cases and enterobacteriaparatyphi in one case the one isolate of *S paratyphi A* was sensitive to all or any the antimicrobials tested except cotrimoxazole. Out of forty nine isolates of *S typhi*, only 5 (10.2%) were sensitive to all or any the first anti- infectious disease antimicrobials, whereas forty four (89.8%) were immune to multiple medicine. All of the isolates here were absolutely sensitive to antibiotic drug and ofloxacin, whereas sensitivity to 3rd generation cephalosporins varied between fifty seven and seventy nine. In spite of in vitro resistance, twenty two patients (44%) showed smart clinical response to amoxycillin and Chloromycetin. within the remaining twenty eight patients (56%), response to the on top of medicine was poor, and that they were started on ofloxacin (in kids on top of five years of age) or third generation cephalosporins. Consequently, the response of the patients to those medicine was smart with reprieve at intervals eight days once the beginning of treatment No important effects of quinolones were noted in these kids. They terminated that quinolones will be employed in kids on top of five years aged in multidrug - resistant infectious disease. The speedy unfold of multidrug resistant (MDR) infectious disease has posed an excellent challenge for the treatment of those cases everywhere the globe nowadays. Once the emergence of Chloromycetin resistant typhoid bacillus strains, antibiotic drug has become the drug of selection for the treatment of infectious disease even within the pediatric people. Thus, study at urban center, India, evaluated the role of Rocephin medical aid in bacteriologically confirmed MDR infectious disease cases that failed to reply to 12-14 days of antibiotic drug medical aid. They enclosed one hundred forty kids aged 3-10 years [18,19]. Therefore, they found that antibiotic drug may not represent a reliable and helpful possibility for treating MDR infectious disease. Additionally, Rocephin could also be an efficient different for the treatment of such cases 1.

Limitation of the Study

The limitation of the study was that a number of samples could not be analyzed due to the inadequate quality of the specimen. Overall this study resulted in

giving an updated result of prevalence of Enteric fever and the clinical finding in the Dhaka Shishu (Children) Hospital; it will help to estimate the disease burden of fever diseases caused by Observation Unit Clinical findings of Enteric fever. This will also help in characterization of the enteric pathogens and thus lead to planning for vaccine intervention. The designing and proper choice of vaccine for the people particularly for Dhaka Shishu (Children) Hospital and other Enteric fever endemic to minimize the prevalence of disease.

CONCLUSION

Ceftriaxone is more effective in children with typhoid fever in terms of greater proportion of children becoming afebrile in 96 hours.

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