Harsukh Educational Charitable Society
International Journal of Community Health and Medical Research
Journal home page: www.ijchmr.com doi: 10.21276/ijchmr
Official Publication of "*Harsukh Educational Charitable Society*" [Regd.]
ISSN E: 2457-0117 **ISSN P:**2581-5040 **Index Copernicus value 2016** = 52.13

Original Research

Assessment Of Efficacy Of Ceftriaxone And Ciprofloxacin In Treating Patients With Typhoid Fever: A Comparative Study

Sushil Suri

Associate Professor, Department of General Medicine, Career Institute of Medical Sciences and Hospital, Lucknow, Uttar Pradesh, India.

ABSTRACT
Background: Typhoid fever is caused by Salmonella enterica serovar Typhi (S typhi), a Gram negative bacterium. Rising antimicrobial resistance has been associated with increased severity of illness and related complications. Hence; we planned the present study to assess and compare the efficacy of ceftriaxone and ciprofloxacin in treating patients with typhoid fever. **Materials & methods:** The present study included assessment and comparison of efficacy of ceftriaxone and ciprofloxacin in treating patients with typhoid fever. A total of 50 patients diagnosed with typhoid fever were included in the present study. Random division of the patients into two study groups as follows: Patients of group 1 were given ceftriaxone parenterally (2 g/kg/day) once daily for 7 days. Patients of group 2 were given ciprofloxacin orally (500 mg) twice daily for 10 days. Follow-up was done in all the patients after seven and ten days for assessing the results. Patient was considered as cured when found to be free from clinical signs and symptoms. Likewise, the outcome was categorized as good response or no response. **Results:** Good response to antibiotic therapy was seen in 100 percent of the patients of group 1, whereas it was seen in 84 percent of the patients of group 2. Significant results were obtained while comparing the clinical response among subjects of both the study groups. **Conclusion:** For treating patients with typhoid, ceftriaxone is a better antibiotic in comparison to ciprofloxacin.

Key words: Ceftriaxone, Ciprofloxacin, Typhoid fever

Corresponding Author: Dr. Sushil Suri, Associate Professor, Department of General Medicine, Career Institute of Medical Sciences and Hospital, Lucknow, Uttar Pradesh, India.

This article may be cited as: **:** Suri S. Assessment Of Efficacy Of Ceftriaxone And Ciprofloxacin In Treating Patients With Typhoid Fever: A Comparative Study HECS Int J Comm Health Med Res 2018; 4(4):77-79

INTRODUCTION

Although advances in public health and hygiene have led to the virtual disappearance of enteric fever (more commonly termed typhoid fever) from much of the developed world, the disease remains endemic in many developing countries. Typhoid fever is caused by Salmonella enterica serovar Typhi (S typhi), a Gram negative bacterium.[1-3] Typhoid fever is among the most common febrile illnesses encountered by practitioners in developing countries. The advent of antibiotic treatment has led to a change in the presentation of typhoid, and the classic mode of presentation with a slow and "stepladder" rise in fever and toxicity is rarely seen. However, rising antimicrobial resistance has been associated with increased severity of illness and related complications.[4-6]

Fluroquinolone (ciprofloxacin and olfloxacin) have for some years been the drugs of choice for enteric fever, but resistance to these drugs has become very common in South Asia and has sporadically been reported in sub-Saharan Africa.[7,8]

Hence; we planned the present study to assess and compare the efficacy of ceftriaxone and ciprofloxacin in treating patients with typhoid fever.

MATERIALS & METHODS

The present study was planned in the department of general medicine of the medical institute and it included assessment and comparison of efficacy of ceftriaxone and ciprofloxacin in treating patients with typhoid fever. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 50 patients diagnosed with typhoid fever were included in the present study. Random division of the patients into two study groups as follows:

Group 1: included 25 patients who were given ceftriaxone therapy,

Group 2: included 25 patients who were given ciprofloxacin therapy

Detailed clinical and demographic data of all the patients was recorded. Blood samples were collected from all the patients for assessing the complete hematological profile. MacConkey and blood agar plates were used for identifying and assessing the growth of organism. In all the patients, Widal agglutination test was performed. Exclusion criteria for the present study included:

- Patients with positive history of any other systemic illness,

- Patients allergic to ceftriaxone or ciprofloxacin,

Patients of group 1 were given ceftriaxone parenterally (2 g/kg/day) once daily for 7 days. Patients of group 2 were given ciprofloxacin orally (500 mg) twice daily for 10 days. Follow-up was done in all the patients after seven and ten days for assessing the results. Patient was considered as cured when found to be free from clinical signs and symptoms. Likewise, the outcome was categorized as good response or no response. Occurrence of post treatment complications, if any, was recorded. All the results were recorded and were compared. SPSS software was used for evaluation of results. Chi- square test was used for assessment of level of significance.

RESULTS

In the present study, a total of 50 subjects were assessed. All the patients were broadly divided into two study groups- Group 1 and Group 2. The mean age of subjects of group 1 and group was 35.6 and 34.2 years respectively. There were 14 males and 11 females in group 1, while there were 12 males and 13 females in group 2. Majority of patients in both the study groups belonged to the age group of 30 to 50 years. Mean RBC count among the subjects of group 1 and group 2 was 4.1 and 3.8 thousand/cm^2 respectively. Mean WBC count among the subjects of group 1 and group 2 was 2.9 and 2.4 thousand/cm^2 respectively. Mean Hb account among the subjects of group 1 and group 2 was 9.5 and 11 thousand/cm^2 respectively. Good response to antibiotic therapy was seen in 100 percent of the patients of group 1, whereas it was seen in 84 percent of the patients of group 2. Significant results were obtained while comparing the clinical response among subjects of both the study groups.

Table 1: Demographic data

Parameter		Group 1 (n)	Group 2 (n)
Age group (years)	Less than 30	5	7
	30 to 50	15	16
	More than 50	5	2
Gender	Males	14	12
	Females	11	13

Table 2: Hematological findings

Parameter	Group 1	Group 2	P- value
RBC count (thousands/cm ^{2})	4.1	3.8	0.58
WBC count (thousands/cm ^{2})	2.9	2.4	0.01*
Hb (g/dl)	9.5	11	0.02*

*: Significant

Graph 1: Demographic data

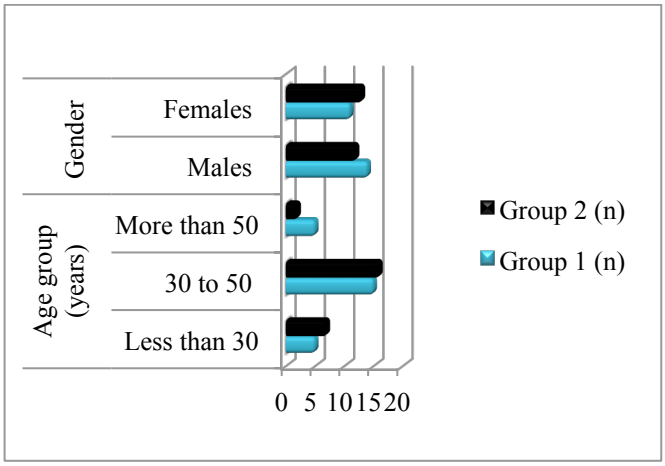
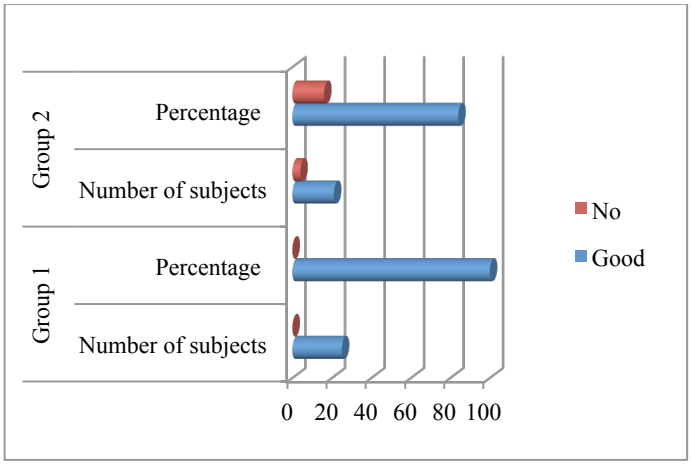


Table 3: Clinical response of the treatment

Response	Group 1		Group 2		P-value
	Number of subjects	Percentage	Number of subjects	Percentage	
Good	25	100	21	84	0.01*
No	0	0	4	16	

*: Significant

Graph 2: Clinical response of the treatment



DISCUSSION

A total of 50 subjects were enrolled in the present study and were broadly divided into two study groups- Group 1 and Group 2. The mean age of subjects of group 1 and group was 35.6 and 34.2 years respectively. There were 14 males and 11 females in group 1, while there were 12 males and 13 females in group 2. Smith MD et al compared the efficacy of ofloxacin (200 mg, every 12 h) and

ceftriaxone (3 g, once daily) given intravenously for 3 days in treating uncomplicated enteric fever. Salmonella paratyphi type A was isolated from six patients. Salmonella typhi was isolated from 41 patients; 63% of these isolates were resistant to multiple antibiotics: ampicillin, chloramphenicol, sulfamethoxazole, trimethoprim, and tetracycline. Of the culture-confirmed cases, treatment with ofloxacin resulted in complete cure of all 22 patients, whereas 18 of 25 patients treated with ceftriaxone were completely cured. In the ceftriaxone group, there were six acute treatment failures and one relapse. Mean +/- standard deviation fever clearance times were 81 +/- 25 h for ofloxacin and 196 +/- 87 h for ceftriaxone. Short-course treatment with oral ofloxacin (5 days) is significantly better than that with ceftriaxone (3 days) and will be of particular benefit in areas where multiresistant strains of S. typhi are encountered.[9] In the present study, majority of patients in both the study groups belonged to the age group of 30 to 50 years. Mean RBC count among the subjects of group 1 and group 2 was 4.1 and 3.8 thousand/cm^2 respectively. Mean WBC count among the subjects of group 1 and group 2 was 2.9 and 2.4 thousand/cm^2 respectively. Mean Hb account among the subjects of group 1 and group 2 was 9.5 and 11 thousand/cm^2 respectively. Thaver D et al reviewed evidence supporting use of fluoroquinolones as first line agents over other antibiotics for treating typhoid and paratyphoid fever (enteric fever). Trials comparing fluoroquinolones with chloramphenicol, cephalosporins, or azithromycin in culture-proven enteric fever were included. Two reviewers extracted data and assessed methodological quality. Odds ratios with 95% confidence intervals were estimated. Trials recruiting over 60% children were analysed separately from trials on adults. Primary outcomes studied were clinical failure, microbiological failure, and relapse. Twenty trials were included. Trials were small and often of limited methodological quality. Only 10 trials concealed allocation and only three were blinded. In trials on adults, fluoroquinolones were not significantly different from chloramphenicol for clinical failure (594 participants) or microbiological failure (n=378), but reduced clinical relapse. Azithromycin and fluoroquinolones were comparable. Compared with ceftriaxone, fluoroquinolones reduced clinical failure but not microbiological failure or relapse. Compared with cefixime, fluoroquinolones reduced clinical failure and relapse. In trials on children infected with nalidixic acid resistant strains, older fluoroquinolones (ofloxacin) produced more clinical failures than azithromycin, but there were no differences with newer fluoroquinolones. Fluoroquinolones and cefixime were not significantly different. In adults, fluoroquinolones may be better than chloramphenicol for preventing clinical relapse.[10] In the present study, good response to antibiotic therapy was seen in 100 percent of the patients of group 1, whereas it was seen in 84 percent of the patients of group 2. Significant results were obtained while comparing the clinical response among subjects of both the study groups. Zmora N et al assessed the efficacy of combining third-generation cephalosporin therapy with azithromycin on the outcomes of TF in patients living in an endemic region. Only culture-confirmed TF cases were eligible. Patients were alternately allocated to one of four study arms: hospitalized patients received either intravenous ceftriaxone or a combination of ceftriaxone and oral azithromycin, while outpatients received either oral azithromycin or a combination of oral azithromycin and cefexime. The primary outcome evaluated was FCT and the secondary outcomes included duration of bacteremia. 105 blood culture-confirmed patients, of whom 51 were treated as outpatients, were eligible for the study. Of the 88 patients who met the inclusion criteria for FCT analysis 41 patients received a single-agent regimen, while 47 patients received a combined regimen. Results showed that FCT was significantly shorter for the latter (95 versus 88 hours, respectively, p = 0·004), and this effect was exhibited in both the hospitalized and the outpatient sub-groups. Repeat blood cultures, drawn on day 3, were positive for 8/47 (17%) patients after monotherapy, versus 2/51 (4%) after combination therapy (p = 0·045). No severe complications or fatalities occurred in any of the groups. Combined therapy of third-generation cephalosporins and azithromycin for TF may surpass monotherapy in terms of FCT and time to elimination of bacteremia.[11]

CONCLUSION

Under the light of above obtained data, the authors conclude that for treating patients with typhoid, ceftriaxone is a better antibiotic in comparison to ciprofloxacin. However; further studies are recommended for better exploration of results.

REFERENCES

1. Renuka K, Sood S, Das BK, Kapil A. High-level ciprofloxacin resistance in Salmonella enterica serotype Typhi in India. J Med Microbiol 2005;54: 999-1000.
2. Crump JA, Luby SP, Mintz ED. The global burden of typhoid fever. Bull World Health Org 2004;82: 346-53.
3. Rowe B, Ward LR, Threlfall EJ. Multidrug-resistant Salmonella typhi: a worldwide epidemic. Clin Infect Dis 1997;24(suppl 1): S106-9.
4. Bhutta ZA. Impact of age and drug resistance on mortality in typhoid fever. Arch Dis Child 1996;75: 214-7.
5. Shirakawa T, Acharya B, Kinoshita S, Kumagai S, Gotoh A, Kawabata M. Decreased susceptibility to fluoroquinolones and gyrA gene mutation in the Salmonella enterica serovar Typhi and Paratyphi A isolated in Kathmandu, Nepal, in 2003. Diagn Microbiol Infect Dis 2006;54: 299-303.
6. Parry CM, Hien TT, Dougan G, White NJ, Farrar JJ. Typhoid Fever. N Engl J Med. 2002;347: 1770-82.
7. Maskey AP, Day JN, Tuan PQ, et al. Salmonella enterica Typhi and Paratyphi A cause indistinguishable clinical syndromes in Kathmandu, Nepal. Clin Infect Dis 2006;42: 1247-1253.
8. Graham SM. Salmonellosis in children in developing and developed countries and populations. Curr Opin Infect Dis 2002;15: 507-12.
9. Smith MD, Duong NM, Hoa NT, et al. Comparison of ofloxacin and ceftriaxone for short-course treatment of enteric fever. Antimicrobial Agents and Chemotherapy. 1994;38(8):1716-1720.
10. Thaver D, Zaidi AKM, Critchley J, Azmatullah A, Madni SA, Bhutta ZA. A comparison of fluoroquinolones versus other antibiotics for treating enteric fever: meta-analysis. The BMJ. 2009;338:b1865.
11. Zmora N, Shrestha S, Neuberger A, et al. Open label comparative trial of mono versus dual antibiotic therapy for Typhoid Fever in adults. Darton TC, ed. PLoS Neglected Tropical Diseases. 2018;12(4):e0006380.

Source of support: Nil
Conflict of interest: None declare