Original Article

Study of Clinical Profile and Antibiotic Sensitivity in Paratyphoid Fever Cases Admitted at Teaching Hospital in South India

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Abstract

Context: Globally, there has been an increase in incidence of paratyphoid fever, including paratyphoid fever caused by antimicrobial-resistant strains. Studying the clinical profile and antimicrobial sensitivity of paratyphoid fever would help in early diagnosis, appropriate treatment, rational use of antibiotics and prevent drug resistance. **Aim:** The aim of the study was to evaluate the clinical profile and sensitivity patterns of antibiotics used in the treatment of paratyphoid fever. **Settings and Design:** A record-based study was done in tertiary care hospital, South India. **Materials and Methods:** A retrospective analysis of culture-proven cases of paratyphoid fever was done in a tertiary care hospital. The socio-demographic characteristics, mode of presentation and the sensitivity pattern of isolates from blood culture were recorded. One hundred and ten case files of *Salmonella paratyphi* were reviewed from the medical records section and the required data (data regarding the clinical profile and antibiotic sensitivity) was collected and analyzed using SPSS version 11.5. **Results:** Fever was present in all patients. All the cases were sensitive for third-generation cephalosporins, and only 31.8% of the cases were sensitive for quinolones. Sensitivity towards other antibiotics in descending order was as follows: ampicillin 93.6%, chloramphenicol 91.8%, aminoglycosides 90.4% and sulphonamides 76.4%. **Conclusions:** Research shows that there is increasing resistance to fluoroquinolones and sensitivity to chloramphenicol. Considering the changing trend in the sensitivity pattern, the recommendations of treatment for enteric fever need to be rationalized and re-considered.

Keywords: Antibiotic sensitivity, enteric fever, paratyphoid

Introduction

Enteric fever (typhoid and paratyphoid fever) is a major human bacterial infection. Although the disease is not common in industrialized countries, it remains an important and persistent health problem in countries without adequate sanitation and a safe water supply.[1] Hospital-based studies and outbreak reports from India indicate that enteric fever is a major public health problem in this country, with *Salmonella enterica* serovar Typhi (*S. typhi*) the most common etiological agent but with an apparently increasing proportion of cases due to *Salmonella paratyphi*.[2] It is reported that there is one case of paratyphoid for every four cases of typhoid fever. Global emergence of multidrug-resistant (MDR) strains and of strains with reduced susceptibility to fluoroquinolones is of great concern.[3]

The paratyphoid fever is, in general, a milder disease with a lower incidence of complications than enteric fever and with comparatively few deaths. Blood culture is the gold standard for diagnosis and also gives information pertaining to the antibiotic sensitivity of the isolate; however, cost of culture, lack of culture methods and prior administration of antibiotics are impediments in this diagnostic approach. Widal test is commonly used in Indian set up but has very variable sensitivity and specificity and therefore present problems in interpretation. Currently, fluoroquinolones and third-generation cephalosporins are the drugs of choice for the treatment of paratyphoid fever, although decreased susceptibility to these antimicrobials have also been reported.[4] Similar observations in our institute prompted us to study the clinical presentation of paratyphoid fever and review the antimicrobial drug susceptibility pattern.

Access this article online

Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/2249-4863.104981

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Materials and Methods

The present research was undertaken to study the clinical profile and antibiotic sensitivity of paratyphoid fever cases. It was a retrospective study conducted in Kasturba Hospital, Manipal, a tertiary care teaching hospital in Udupi district which provides specialty health care to neighboring four districts in coastal Karnataka state. The records of all patients admitted during the study period from January 2005 to December 2010 with a diagnosis of paratyphoid fever were analyzed. One hundred and ten culture positive (Bact/alert Biomeriux culture kits) paratyphoid fever cases were included for the study. Cases of paratyphoid fever diagnosed on the basis of only clinical examination and Widal test were excluded from the study. The mode of clinical presentation, laboratory diagnosis, complications, response to treatment and antibiotic susceptibility patterns were recorded from the medical records section. The data was collected and analyzed using Statistical Package for Social Sciences version 11.5.

Results

The retrospective study showed 141 cases of paratyphoid fever, out of which 110 patients showed positive on blood culture for *S. paratyphi*. The socio-demographic characteristics are depicted in Table 1. Table 2 presents the clinical features of the patients.

Fever was present in all the patients. Vomiting (35, 31.8%), diarrhea (23.6%) and pain abdomen (15, 13.6%) were the most common presenting symptoms. Out of the 110 culture positive cases, 48 (43.6%) tested positive for Widal test. Average duration of hospital stay was 8.4 days. For a large number of patients, duration of hospital stay was around 6–10 days (67.3%), only 2 patients were admitted beyond 15 days.

All the cases were sensitive for cephalosporins and only 31.8% of the cases were sensitive for quinolones. Sensitivity towards other antibiotics in descending order was as follows: Penicillin 93.6%, chloramphenicol 91.8% and sulphonamides 76.4%. The sensitivity of *S. paratyphi* towards quinolones have decreased markedly over the years, while sensitivity patterns toward other antibiotics have improved. In the year 2009 and 2010, *S. paratyphi* showed 100% resistance to quinolones. Majority of the paratyphoid cases (46.4%) were treated with ceftriaxone alone and 18.4% with the combination of ceftriaxone and quinolones. Majority (97.3%) of the paratyphoid cases recovered completely.

Table 1: Socio-demographic characteristics

Character	Number	Percentage
Total cases	110	100.00
Gender		
Male	71	64.5
Female	39	35.5
Age group (in years)		
1–14	04	3.6
15–30	71	64.5
31–45	20	18.2
46–60	11	10
>60	04	3.6
Yearwise		
2005	2	1.8
2006	33	30
2007	23	20.9
2008	26	23.6
2009	11	10
2010	15	13.6
Residency status		
Udupi District	42	38.2
Out of Udupi	29	26.4
Out of Karnataka	39	35.5
Occupation		
Student	49	44.5
Semi-skilled	27	24.5
Skilled	14	12.7
Unskilled	3	2.7
Housewife	12	10.9
Professional	1	0.9
White-collar job	2	1.8
Pre-school	2	1.8

Discussion

The study conducted at Ludhiana revealed that there was a steady increase in the number of paratyphoid cases and the antibiotic sensitivity was 91.48% for chloramphenicol, 95% for

Table 2: Clinical profile of culture proven cases of paratyphoid fever (*n* = 110)

Character	Number	Percentage
Signs on presentation		
Splenomegaly	39	35.5
Abdominal tenderness	21	19.1
Hepatomegaly	34	30.9
Hepatosplenomegaly	16	14.5
Rash	4	3.6
Antibiotic sensitivity		
Quinolones	35	31.8
Cephalosporins	110	100.0
Aminoglycoside	76	90.4
Chloramphenicol	101	91.8
Sulfonamides	84	76.4
Ampicillin	103	93.6
Complications		
Enteric hepatitis	64	58.1
Gastrointestinal bleeding	2	1.8
Leucopenia and thrombocytopenia	4	3.6
Myocarditis	1	0.9
Leucopenia	1	0.9
Thrombocytopenia	1	0.9
Pancytopenia	1	0.9
Sepsis	1	0.9

ampicillin, and 100% sensitive to ciprofloxacin, cefotaxime and gentamicin.[5] This was similar to the study done at Rourkela and Nagpur in India.[6] But our study showed decreased sensitivity to fluoroquinolones. This finding is also supported by a study done by Chandel *et al.* which showed that 32% isolates of *S. paratyphi* A had decreased susceptibility to ciprofloxacin.[7] However, 86 (90.5%) isolates were susceptible to chloramphenicol, which is similar to the results seen in a study done by Varsha *et al.*[8] In a study conducted in Mumbai, 36 cases showed positive culture report for *S. paratyphi* and none of the isolates showed block resistance to ampicillin, chloramphenicol and cotrimoxazole.[9] In a study done by Thankiwale *et al.* it was found that 18 (46.15%) of 39 Salmonella isolates were *S. paratyphi* A and all were sensitive to ciprofloxacin and cefotaxime.[10]

In a review done by Effa *et al.* comprising twenty-six studies, involving 3033 patients, concluded that the newer fluoroquinolone, gatifloxacin, remains effective in some regions where resistance to older fluoroquinolones has developed.[11] Similar results were reported in a study conducted in Karachi. The study highlights the trials on children infected with nalidixic acid-resistant strains, older fluoroquinolones (ofloxacin) produced more clinical failures than azithromycin (2.67 (1.16 to 6.11), n = 125, 1 trial), but there were no differences with newer fluoroquinolones (gatifloxacin, n = 285, 1 trial).[12]

In a study done by Effa EE, Bukirwa H to compare azithromycin with other antibiotics for treating uncomplicated enteric fever, it was observed that azithromycin appears better than fluoroquinolone drugs in populations that included participants with drug-resistant strains. It was also noted that azithromycin may perform better than ceftriaxone.[13]

The emergence of isolates resistant to fluoroquinolones demands to have a good clinical practice with rational use of antibiotics. In a study done by John A, the optimal antimicrobial treatment of patients with enteric fever depends on an understanding of antimicrobial resistance and antimicrobial susceptibility testing of the Salmonella isolated from the individual patients. Patients infected with Salmonella with decreased ciprofloxacin susceptibility may not respond adequately.[14] Chloramphenicol and other antimicrobials like Ampicillin, Sulphonamides and Aminoglycosides may still be utilized in treatment of paratyphoid fever, as the organism is sensitive to these drugs. Third-generation cephalosporins are gaining importance in the treatment of enteric fever as one of the first choice of therapy. With increasing resistance to fluoroquinolones and possibility of re-emergence of sensitivity to chloramphenicol, the policy of treatment of enteric fever needs to be rationalized. In a population-based surveillance of typhoid fever in Egypt, 71% of typhoid fever patients are managed by primary care providers. MDR *S. typhi* was isolated from 26 (29%) patients. The majority of patients are evaluated at the primary care level and would not have been detected by hospital-based surveillance.[15]

Evidence suggests of having state of art surveillance on antimicrobial susceptibility pattern for *S. paratyphi* from different parts of the country. This will help in updating the knowledge of primary care physicians and specialists to use proper antibiotics for therapeutic cure.

Conclusion

In our study only 31.8% of the cases were sensitive to ciprofloxacin. Similar results of low sensitivity to ciprofloxacin and high sensitivity to cephalosporins were reported in other studies done in India and other parts of the world. The policy of treating paratyphoid fever cases at all levels of health care need to be reconsidered. This will prevent the possible emergence of multidrug-resistant paratyphoid cases.

Acknowledgments

The authors thank the Medical Superintendent of Kasturba Hospital, Manipal and Heads of the Department of Community Medicine and Medicine, Kasturba Medical College, Manipal University, Manipal.

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How to cite this article: Pandit V, Kumar A, Kulkarni MM, Pattanshetty SM, Samarasinghe C, Kamath S. Study of clinical profile and antibiotic sensitivity in paratyphoid fever cases admitted at teaching hospital in South India. J Fam Med Primary Care 2012;1:118-21.

Source of Support: Nil. **Conflict of Interest:** None declared.