Short Communication

Study of Clinical Profile and Antibiotic Sensitivity Pattern in Culture-positive Typhoid Fever Cases

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ABSTRACT

Background: Salmonella enteric serotype Typhi has created a significant therapeutic problem as these strains have developed resistance to the commonly used antimicrobials for the treatment of typhoid fever. **Objectives:** To assess the clinical profile and sensitivity patterns to anti-typhoid drugs. **Materials and Methods:** A retrospective analysis of 106 culture-positive typhoid cases admitted in a tertiary care hospital during the years 2005-2008. **Results:** Records of 106 patients were evaluated, 83 (78.3%) males and 23 (21.7%) females. Fever was present in all patients. Headache in 63 (59.4%) patients and generalized body ache in 53 (32.5%) patients were the most common symptoms, while spleenomegaly in 47 (44.3%) patients and hepatomegaly in 42 (39.6%) patients were the common presenting signs. A maximum sensitivity of 96.6% was observed with cephalosporins, whereas a resistance of 29.2% was seen with fluoroquinolones. **Conclusion:** A high degree of sensitivity was noted to chloramphenicol, ampicillin and sulphonamides, showing a trend of roll-back of sensitivity to conventional antibiotics.

Keywords: Antibiotic sensitivity, clinical profile, typhoid fever

Introduction

Typhoid fever is a systemic infection that evolved about 50,000 years ago,[1] having remarkable mechanisms for persistence in its host.[2] It occurs in all parts of the world where there is substandard water supply and sanitation.[3] The disease remains a serious public-health problem in the developing countries.[4] The advent of chloramphenicol treatment changed the perception of typhoid fever from a severe to a readily manageable infection.[5] Outbreaks of chloramphenicol-resistant typhoid was reported in 1972. In the late 1980s and 1990s, outbreaks of typhoid caused by organisms resistant to chloramphenicol, cotrimoxazole, ampicillin and amoxicillin were reported.[6] Currently, decreased susceptibility has also been reported to fluoroquinolones and third-generation cephalosporins.[7-10] With this background in mind, it becomes imperative to assess the extent of drug resistance before treatment is administered. Therefore, this study aimed to study the antibiotic sensitivity pattern among typhoid fever cases in a tertiary care setting, which most often caters to referred cases unsuccessfully treated elsewhere.

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Materials and Methods

A retrospective record-based analysis was carried out for all the culture-proven typhoid cases admitted to a tertiary care teaching hospital in Southern Karnataka. Due permission was sought from the hospital authorities to access the records. The medical records of all patients admitted from 1 January 2005 to 31 December 2008 with a diagnosis of typhoid fever were analyzed. Only culture-positive (Bact/alert Biomeriux culture kits) typhoid fever cases were included for the study. Of the 616 clinically suspected cases reporting to the hospital, 106 individuals who were culture positive for *Salmonella*

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typhi during the study period were included in this study. Cases of typhoid 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 case records. Data was entered and analyzed using SPSS version 11.5. Data has been summarized using percentages and proportions.

Results

Among the 106 individuals who were culture positive for *Salmonella typhi*, majority [83 (78.3%)] were males and 23 (21.7%) were females. Majority of the patients were (55.7%) in the age group of 15-30 years, and were students (39.6%). The mean age of the patients was 28.8 years (SD 1.32). People engaged in skilled and semiskilled occupation constituted 46%, while housewives [9 (8.5%)] and children [4 (3.8%)] formed the rest of the study population in addition to students. The average duration of hospital stay was 8.7 days. Fever was present in all the patients. Headache, vomiting, abdominal pain and diarrhea were the common associated symptoms seen in 63 (59.4%), 30 (28.3%), 21 (19.8%) and 29 (27.4%) patients, respectively. Splenomegaly was seen in 47 (44.3%), hepatomegaly was present in 42 (39.6%) while hepatosplenomegaly was seen in 23 (21.7%). Abdominal tenderness was another common presenting sign [23 (21.7%)]. Widal was concomitantly positive in 73 (68.9%) cases. Liver enzymes (alanine aminotransferase, aspartate aminotransferase and alkaline phosphatase) were raised in 52 (49.1%) patients. Complications were very few. Only one patient each had gastrointestinal bleed, gastrointestinal perforation, myocarditis and encephalitis as complications. The outcome was favorable, with 92.5% patients recovering from the illness. Relapse of the disease was seen among two (1.9%) cases, while five patients (4.7%) were discharged against medical advice. Antibiotic sensitivity for cephalosporins was 96.2% while antibiotic resistance was 29.2% with fluoroquinolones. Sensitivity to chloramphenicol was 92.5%, ampicillin 85% and sulphonamides 82.1%, as described in Table 1. Majority [50 (47.6%)] of the typhoid cases were treated with ceftriaxone. Another five (4.8%) cases were treated with quinolones. A combination of ceftriaxone and quinolones were given for 32 cases (30.5%). Rest of the patients were treated with a combination of antibiotics, including beta lactams, quinolones, aminoglycosides and sulphonamides. The overall outcome of the patients was good; 99 (92.5%) patients recovered without any complications.

Table 1: Antibiotic sensitivity pattern among culture-positive typhoid fever cases (*n*=106)

	Sensitive		Resistant	
	No. of cases	%	No. of cases	%
Cephalosporins	102	(96.2)	4	(3.8)
Quinolones	75	(70.8)	31	(29.2)
Aminoglycosides	100	(94.3)	6	(5.7)
Choloramphenicol	98	(92.4)	8	(7.5)
Sulphonamides	87	(82.0)	19	(17.9)
Ampicillin	90	(84.9)	16	(15.1)

Discussion

The clinical profile of enteric fever in our study was similar to that reported in other studies.[11-14] Fever was always present, and was often associated with headache. Diarrhea and vomiting were frequently encountered, but constipation (7.5%) was not very common. Splenomegaly, hepatomegaly and abdominal tenderness were the common signs. Hepatic dysfunction in the form of raised liver enzymes was seen in 49.1% of our patients. Rasool *et al*. also reported a high incidence of liver dysfunction (54.2%).[15]

The antibiotic sensitivity pattern in the patients showed a high level of resistance to fluoroquinolones at 29.2%. Decreasing susceptibility of *Salmonella typhi* to ciprofloxacin has been well documented in several studies,[3,16-18] and is indicative of the effects of indiscriminate use of this group of antibiotics. Sensitivity to cephalosporins in the current study was high, as reported in other studies.[11,16-18] The change in the resistance patterns of chloramphenicol, ampicillin and cotrimoxazole is noteworthy.[18] The following resistance pattern of serotype Typhi strains was observed from Kolkata: chloramphenicol, 13%; ampicillin, 13%; amoxicillin–clavulanic acid, 0%; cotrimoxazole, 15%; ciprofloxacin, 10%; ofloxacin, 2%; and ceftriaxone, 0%. A significant decrease over the years in resistance to chloramphenicol, ampicillin and cotrimoxazole was noticed (P<0.0001).[18] Sensitivity to the conventional antibiotics, especially chloramphenicol is high (92.5%). Similar findings were reported in other studies.[18,19] Our study thus confirms a roll-back sensitivity of *Salmonella typhi* to chloramphenicol.

Our findings indicate a remarkable reversal in the resistance pattern of serotype *Salmonella typhi*. Similar trends have been noted in several other studies.[13,18-20] The emergence of isolates resistant to ciprofloxacin suggests that if irrational and indiscriminate use persists, it is probably only a matter of time before the organisms develop widespread resistance to fluoroquinolones. Therefore, chloramphenicol and other antimicrobials like ampicillin, sulphonamides and aminoglycosides may still be used in the treatment of typhoid fever, as the organism is sensitive to these drugs. There is an urgent need to keep the possible emergence of untreatable strains to a minimum by the administration of appropriate antibiotics as indicated by the sensitivity tests.

Conclusion

A high degree of sensitivity was noted to conventional antibiotics, stressing the need for rational use of antibiotics after appropriate and timely antibiotic sensitivity and resistance testing.

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