

RESEARCH ARTICLE

ANTIBIOGRAM OF *SALMONELLA* TYPHI ISOLATED FROM ENTERIC FEVER CASES IN A TERTIARY HEALTH CARE CENTRE IN IMPHAL

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ABSTRACT

The sensitivity/resistance pattern of Salmonella spp. had been varying with time and geographical locations. This is a cross sectional study that describes the trend of antimicrobial susceptibility of Salmonella Typhi isolated from enteric fever cases. The present study was carried out in Regional Institute of Medical Sciences, Imphal, Manipur from October 2010 to March 2012. Salmonella isolates obtained from 200 blood culture of clinically suspected enteric fever cases were studied and their sensitivity pattern to chloramphenicol, ampicillin, cotrimoxazole, nalidixic acid, ciprofloxacin, azithromycin, cefixime and ceftriaxone analysed by Kirby-Bauer method according to the Clinical Laboratory Standard Institute (CLSI) guidelines. A total of 16 (8%) Salmonella Typhi were obtained. The present study showed 100% sensitivity to chloramphenicol and cotrimoxazole and 100% resistance to ciprofloxacin and nalidixic acid. 14 isolates (87.5%), 12 isolates (75%), 10 isolates (62.5%), 7 isolates (43.7%) were sensitive to ceftriaxone, ampicillin, cefixime, azithromycin respectively. The present study reveals a changing trend in the antibiotic sensitivity pattern of Salmonella Typhi.

Keywords: Antimicrobial susceptibility, enteric fever, multidrug resistance, *Salmonella* Typhi

INTRODUCTION

Antimicrobial drugs are the greatest contribution of the twentieth century to therapeutics. As a class, they are one of the most frequently used as well as misused drugs^[1]. Strains sensitive to antimicrobial agents have been supplanted by resistant ones rendering it useless. Use in human medicine constitutes 50% (the other half is in animals) and 80% of human use occurs in domiciliary practice, out of hospitals^[2].

Enteric fever (Typhoid fever) continues to be a global health problem with an estimated 12-33 million cases^[3] and 6 lakhs death occurring annually^[4]. Majority of this burden occurs in Asia^[5]. It is endemic in the Indian subcontinent^[6]. It constitutes a major health problem accounting for more than 3 lakhs cases per year. Antibiotic therapy constitutes an integral part in the management of enteric fever since mortality without treatment can be as high as 30%. This can be reduced to <1% by appropriate treatment^[7].

Chloramphenicol was introduced in 1948 as the effective antibiotic in the treatment of typhoid fever. It was the “gold standard” therapy^[8]. Resistance was not a major problem until 1972^[9, 10]. Treatment with chloramphenicol reduces typhoid fever mortality from approximately 20% to 1% and duration of fever from 14-28 days to 3-5 days^[8, 9]. Cotrimoxazole and ampicillin were also used for treatment of enteric fever but problem arose with the development of resistance. The emergence of multidrug resistant strains (resistant to chloramphenicol, ampicillin and cotrimoxazole)^[9] led to the use of first generation fluoroquinolones especially ciprofloxacin as

first line drug for the treatment of enteric fever. It has good in-vitro and clinical activity against *Salmonellae*/MDR *Salmonellosis* [3]. With the development of ciprofloxacin resistance among MDR *Salmonella* Typhi, third generation cephalosporin including ceftriaxone, cefpodoxime proxetil, cefixime, cefepime have been recommended as an alternative [9]. No doubt the discovery of antibiotics revolutionized the management of infectious diseases [10] but changing trends in antibiotic resistance patterns have been reported from different parts of India. So the present study was undertaken to know the antimicrobial susceptibility pattern of *Salmonella* Typhi in a tertiary health care centre in Imphal, Manipur.

MATERIALS AND METHODS

A total of 206 blood samples were obtained aseptically from clinically suspected cases of enteric fever from the outpatient and inpatient department of Medicine and department of Paediatrics, RIMS, Imphal. It was inoculated into Brain Heart Infusion biphasic broth and 0.5% bile broth. It was incubated for 24hrs at 37°C. After overnight incubation, subculture was done on fresh 5% sheep blood agar and MacConkey agar [11]. Positive cultures were identified by cultural characteristics, gram stain morphology and standard biochemical tests. The isolates were confirmed by slide agglutination test using specific antisera (Bio-Rad laboratories India pvt ltd). Antibiotic susceptibility testing was performed by Kirby Bauer disc diffusion method as per CLSI recommendations using ampicillin(10µg), azithromycin(15µg), ciprofloxacin(5µg), nalidixic acid(30/µg), cotrimoxazole(1.25/23.75µg), ceftriaxone(30µg), cefixime(5µg) (Hi-Media Laboratories, Mumbai). For sensitivity testing Mueller-Hinton agar was used. ATCC strain, *Escherichia coli* 25922 available in Microbiology Department, RIMS, Imphal were put to use for quality control purpose [12].

RESULTS

Out of 206 blood samples, *Salmonella* spp. were isolated in 16 (8%) of the patients. All the isolates were *Salmonella* Typhi.

Table 1 and figure 1 shows the antibiotic sensitivity pattern of *Salmonella* Typhi. The study showed a high sensitivity to chloramphenicol (100%) and cotrimoxazole (100%). Susceptibility was found to be 75% for ampicillin, 43.75% for azithromycin, and 56.25% for cefixime. The isolates also showed 100% resistance to nalidixic acid and ciprofloxacin.

Table-1

Antimicrobial agents	Sensitive (%)	Intermediate (%)	Resistant (%)
Ampicillin	75%	12.5%	12.5%
Azithromycin	43.75%	25%	31.25%
Ciprofloxacin	0%	-	100%
Nalidixic acid	0%	-	100%
Cotrimoxazole	100%	-	-
Chloramphenicol	100%	-	-
Ceftriaxone	68.75%	25%	6.25%
Cefixime	56.25%	37.5%	6.25%

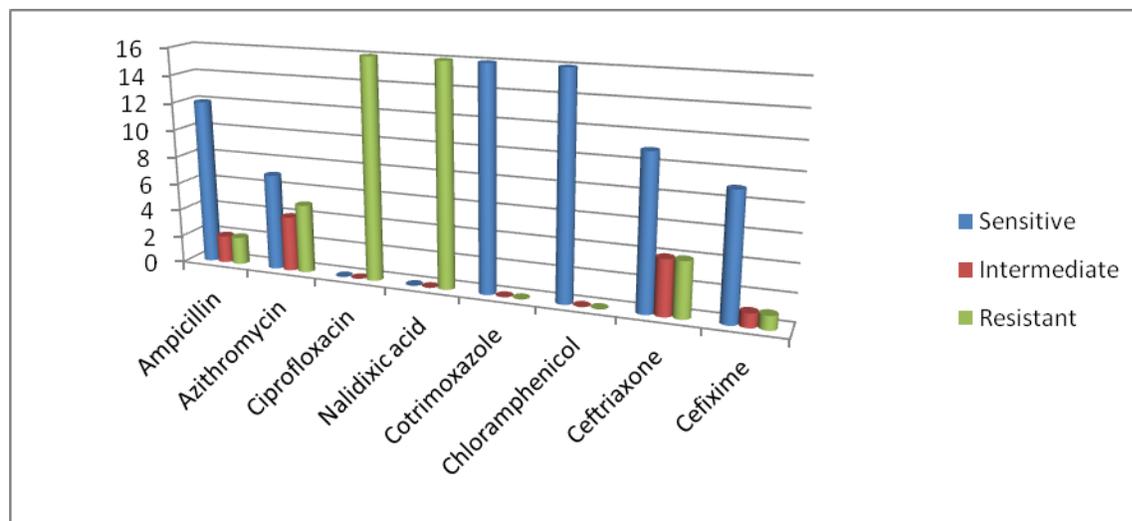


Figure 1

DISCUSSION

Blood culture was positive for *Salmonella* spp. in 16(8%) of the cases in the present study. A higher isolation rate was recorded from different part of the country [13, 14]. A lower isolation rate in this study might be due to prior intake of antimicrobial agents by the patients [1]. All the isolates were *Salmonella* Typhi. It was reported to be the predominant isolate in various regions [15]. *Salmonella* Paratyphi A constituting a few percentages [16].

The emergence of antibiotic resistant strains of bacteria is closely linked to the irrational use of antibiotics in treating human infections. But with time, due to relieve of selection pressure following discontinuation of the resistant drug, re-emergence of antibiotic sensitivity to previously resistant drug was reported [2]. The study showed high level of resistance to ciprofloxacin and nalidixic acid comprising 100% of the strains. High level of resistance was also reported in different regions [17, 18]. There have been reports of declining multidrug resistance [19, 20]. The present study showed similar findings as all the isolates were sensitive to chloramphenicol, and cotrimoxazole. 75% of the isolates were sensitive to ampicillin. The high degree of chloramphenicol susceptibility of *Salmonella* Typhi isolates has also been reported from many parts of India indicating reemergence of chloramphenicol sensitivity [20, 21]. This study also showed 100% sensitivity. In response to the development of ciprofloxacin resistance among multidrug resistant *Salmonella* Typhi, a number of studies have investigated the efficacies of expanded spectrum cephalosporins. In the present study resistance of 37.50% to cefixime was noted. Ceftriaxone recorded a sensitivity of 93.75%. Presently, resistance to third generation cephalosporin has also been reported [22].

CONCLUSION

The present findings reveal a changing trend in antibiotic sensitivity. These first line antibiotics can be recycled as the therapy for enteric fever, being more cost effective, instead of going for higher generation of drugs.

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