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Short Communication

Antibiogram of *Salmonella* serotypes at a tertiary care hospital in North India

[1]Sarita Yadav, [2]Madhu Sharma, [2]Aparna, [2]Uma Chaudhary

[1]Dept. of Microbiology, BPS, GMC for Women, Khanpur Kalan (Sonepat), Haryana
[2]Dept. of Microbiology, Pt. BDS UHS, Rohtak, Haryana, India

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ABSTRACT

Enteric fever is a world-wide problem caused by *Samonella enterica* serotype Typhi or Paratyphi A/B. A considerable variation has been found in the incidence of antibiotic resistance among salmonellae reported from different parts of India. A total of 11059 blood cultures were received in the Department of Microbiology. All the samples were processed by standard microbiological procedures. Antimicrobial susceptibility testing was done following Kirby and Bauer disc diffusion method in accordance with Clinical and Laboratory Standards Institute (CLSI). A total of 51 salmonella serotypes were isolated, out of which 40 (78.4%) were *S*.Typhi and 11(21.6%) were *S*.Paratyphi A. Most effective antibiotics were chloramphenicol and cefepime. The changing antibiogram demands appropriate antibiotic sensitivity testing, good choice, proper dosage, proper duration of therapy and rational prescribing of antibiotics in a particular geographical region.

Key words: enteric fever, *S*.Typhi, typhoid fever, drug resistance

INTRODUCTION

Enteric fever is a world-wide problem caused by *Samonella enterica* serotype *Typhi* or *Paratyphi A/B*. It is endemic in India affecting approximately 6,53,580 persons with about 417 deaths annually[1]. It results in considerable morbidity and resource utilization. Treatment of enteric fever is becoming more complicated and expensive with time. A considerable variation has been found in the incidence of antibiotic resistance among salmonellae reported from different parts of India. So, a retrospective study was carried out to report the incidence, multidrug resistance (MDR) and phage types of *S*.Typhi and *S*.Paratyphi A/B during the last two years at our hospital.

MATERIAL AND METHODS

A total of 11059 blood cultures were received in the Department of Microbiology from January 2007- December 2008. All the samples were processed by standard microbiological methods[2]. The isolates of salmonella were identified by standard biochemical tests. Confirmation was done by slide agglutination tests using monospecific antisera. Antimicrobial susceptibility testing was done following Kirby Bauer disc diffusion method as per Clinical and Laboratory Standards Institute (CLSI) guidelines by using commercial discs (HiMedia) of amoxycillin, chloramphenicol, co-trimoxazole, ciprofloxacin, cefepime, nalidixic acid, ofloxacin and ceftriaxone [3]. Phage typing was done at the National Salmonella Phage typing centre, Lady Hardinge Medical College, New Delhi.

RESULTS

A total of 51 salmonella serotypes were isolated, out of which 40 (78.4%) were *S*.Typhi and 11(21.6%) were *S*.Paratyphi A. Most effective antibiotic for *S*.Typhi and *S*.Paratyphi A were chloramphenicol (92.5% and 72.72%) and cefepime(90% and 72.72%) respectively (Table 1). Phage typing was done for 14 salmonella isolates. Ten isolates of *S*.Typhi belonged to phage type E1 biotype I, two were phage type 28 and biotype II and *S*.Paratyphi A isolates were of phage type 1.

DISCUSSION

Enteric fever continues to be a major health problem especially in the developing countries and the mortality is as high as 30%. The disease is common in community with low standards of

***Corresponding Author Address:** Dr. Sarita Yadav, Asstt. Prof. (Microbiology Deptt), BPS, GMC for Women, Khanpur Kalan Sonepat (Haryana), India; E-mail: yadav78sarita@yahoo.com*

public health. Drug resistance in typhoid fever is of considerable importance to microbiologist and is posing a great therapeutic threat. In comparison to the earlier report[4] from our institute, there appears to be a decrease in multi-drug resistant *S*.Typhi from 63.9% to 30% but incidence of MDR *S*.Paratyphi A has remained the same.

Ampicillin, chloramphenicol and co-trimoxazole had been the mainstay of treatment for typhoid fever, but with the emergence of resistance they fell in disuse. There is a change in the antibiogram of *S*.Typhi now, with re-emergence of sensitivity to these first line drugs[4,5]. Our study is in agreement with the same except for amoxycillin(37.5%) which was not found to be effective. Mathura et al[6] also reported 63% of resistance to amoxycillin.

Nalidixic acid resistant *S*.Typhi is found to be endemic in Indian subcontinent[7]. In the present study also 85% *S*.Typhi isolates were nalidixic acid resistant. Various studies from North India have also documented a rise in ciprofloxacin resistance[4,5]. We also observed a continuous reduction in the sensitivity of ciprofloxacin in our region from 89% (1997) and 81% (2001)[4] to 75%. This is a matter of concern and is probably linked to the irrational use of ciprofloxacin in treating human infections.

Decreased sensitivity to ciprofloxacin led to the use of 3rd and 4th generation cephalosporins as the possible alternatives for MDR isolates. Whereas, in our study not only resistance to ceftriaxone (28%) was noted but 10% isolates were found to be resistant to cefepime as well, an event also noticed in other countries[8,9]. These agents are expensive for routine use in developing nations and there is also a growing concern that their extensive use in outpatient settings will select beta lactamases thereby deteriorating the problem of multi-drug resistance.

In the present study, the most prevalent phage type was E1 (83.3%) followed by phage type 28. A recent study from Ludhiana(66.01%)[10], also reported E1 to be the commonest phage type whereas phage type A was found in highest proportion from Mumbai(45.9%)[11]. In our study, biotyping revealed that majority of isolates belonged to group I and rest to group II. This finding was similar to a report from Kolkata[12].

It is worrisome that we are fast heading towards a situation where emergence of a fastidious, highly resistant salmonella isolate is quite likely. The changing antibiogram demands appropriate antibiotic sensitivity testing, good choice, proper dosage, proper duration of therapy and rational prescribing of antibiotics in a particular geographical region. The newer drugs should be used only for MDR and fulminant cases of enteric fever.

CONCLUSION

To conclude, the rise of antimicrobial resistance is posing formidable challenges in the treatment of serious enteric infections. Urgent measures to discourage the irrational and injudicious use of antibiotics are required to delay the development of resistance.

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Table 1: Sensitivity pattern (%) of *Salmonella* serotypes (n=51)

Antibiotics	*S*.Typhi	*S*.Paratyphi A
Amoxycillin	37.5%	54.54%
Chloramphenicol	92.5%	72.72%
Co-trimoxazole	85.0%	36.36%
Ciprofloxacin	75.0%	36.36%
Cefepime	90.0%	72.72%
Nalidixic acid	15.0%	18.18%
Ofloxacin	80.0%	63.63%
Ceftriaxone	72.5%	72.72%

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