



ORIGINAL ARTICLE

Antimicrobial sensitivity of salmonella typhi in children- A single center study.

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ABSTRACT... Objective: To determine the frequency of antibiotic sensitivity of Salmonella typhi in children. **Study Design:** Prospective Cross Sectional Study. **Setting:** Department of Pediatrics, Children B Unit, Hayatabad Medical Complex, Peshawar. **Period:** 1st April 2021 to 30th June 2022. **Material & Methods:** Pediatric patients admitted to Children B Unit, with blood culture proven enteric fever, were selected for the study. Verbal consent was obtained from the parents. Data was collected from blood culture report forms from microbiology laboratory of our hospital. Results were recorded on excel spreadsheet and analyzed for calculating percentages using MS Excel 2010. Results were presented in table 1. **Results:** This study was conducted on 32 female and 72 male children with blood culture proven enteric fever caused by Salmonella typhi. Sensitivity to Azithromycin was 56.73%, Meropenem 82.69%, Polymixin 86.53%, Colistin 68.26%, Ciprofloxacin 45.19%, Tigecycline 98.07%, Imipenem 95.19%, Amikacin 90.38% and Gentamicin 77.88%. **Conclusion:** Salmonella typhi shows decreasing level of sensitivity to most antibiotics.

Key words: Antimicrobial, Blood Culture, Children, Enteric Fever, Salmonella Typhi, Sensitivity.

INTRODUCTION

Antimicrobial sensitivity of Salmonella typhi in Pakistan is decreasing at alarming rates due to emergence of extensively drug resistant strains of this pathogen.¹ Reports of new Salmonella strains resistant to carbapenems are appearing in literature.²

To handle the issue of widespread resistance, local studies on current antimicrobial sensitivity are essential to determine the antimicrobial agents showing bactericidal activity against the isolated strains of Salmonella typhi.³

To generate latest information on antimicrobial sensitivity of this organism in our setup, we undertake this study. This study will help us in the rational use of effective antibiotics for treating Salmonella typhi infection in our patients.

MATERIAL & METHODS

This cross sectional study was conducted at Department of Pediatrics, Hayatabad Medical

Complex Peshawar from April 2021 to June 2022. Approval of the institutional ethical committee was obtained for this study (1087-6/9/2022). After explaining the purpose of the study, verbal consent was obtained from the parents. Inclusion criteria were pediatric patients with clinical features of enteric fever, admitted to Children B Unit, with blood culture proven Salmonella typhi infection. Patients presenting with fever pattern consistent with malaria, urinary tract infections and meningitis or sepsis were excluded from the study. Data was collected from blood culture report forms from microbiology laboratory of our hospital. Results were recorded on excel spreadsheet and analyzed for calculating percentages using MS Excel 2010. Results were presented in tables.

RESULTS

This study was conducted on 32 female and 72 male children with blood culture proven enteric fever caused by Salmonella typhi.

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Sensitivity to Azithromycin was 56.73%, Meropenem 82.69%, Polymixin 86.53%, Colistin 68.26%, Ciprofloxacin 45.19%, Tigecycline 98.07%, Imipenem 95.19%, Amikacin 90.38% and Gentamicin 77.88%.

DISCUSSION

Sensitivity of *Salmonella typhi* to commonly used antibiotics is decreasing at an alarming rate and multi drug resistant and extensively drug resistant *Salmonella* strains have emerged all over Pakistan.³

This fact necessitates monitoring the trends in antimicrobial susceptibility of *Salmonella typhi*.^{4,5}

This study was carried out to document current sensitivity pattern of *Salmonella typhi* in our set up. The antimicrobials tested in this study included Azithromycin, Amikacin, Ciprofloxacin, Colistin, Gentamicin, Imipenem, Meropenem, Polymixin and Tigecycline. Sensitivity pattern of antibiotics tested in this study is shown in Table-I.

| S No | Antibiotic | Sensitive | Percentage |
|------|---------------|-----------|------------|
| 1 | Azithromycin | 59 | 56.73% |
| 2 | Meropenem | 86 | 82.69% |
| 3 | Polymixin | 90 | 86.53% |
| 4 | Colistin | 71 | 68.26% |
| 5 | Ciprofloxacin | 47 | 45.19% |
| 6 | Tigecycline | 102 | 98.07% |
| 7 | Imipenem | 99 | 95.19% |
| 8 | Amikacin | 94 | 90.38% |

Table-I. Antibiotic sensitivity pattern of salmonella typhi

Our study found 56.73% sensitivity of *Salmonella typhi* to azithromycin. Other studies have reported 83.3% and 89.9%.^{6,7} These findings show that sensitivity toward azithromycin is decreasing. This emerging problem needs serious consideration by all concerned.⁸ Decline in sensitivity to oral agents will lead to difficulties in outpatient management of typhoid. We found 82.69% sensitivity to Meropenem while other authors have reported 91.0%, 93.% and 96.7%.^{9,10,11}

Salmonella sensitivity to imipenem in our study was 95.19% compared to 87.8% and 86.7%

reported in other recent studies.^{9,10}

The findings from these studies indicate decreasing sensitivity of *Salmonella* to the antimicrobials currently considered the most effective agents against this organism.¹²

Salmonella sensitivity to Ciprofloxacin in our study was 54.80%. Other studies reported 50.1% and 53.7% sensitivity to this antimicrobial.^{9,13} These findings show that ciprofloxacin has lost its utility in the treatment of typhoid fever. Our study 98.07% sensitivity of *Salmonella* to Tigecycline as compared to 100% reported by Adnan and colleagues.¹⁰ These findings are satisfying but caution needs to be exercised while considering the option of Tigecycline use for the treatment of *Salmonella typhi* infections.

Decreasing antimicrobial sensitivity of *Salmonella typhi* is on the rise and causing serious clinical concerns because it leads to limitation of therapeutic options available for this pathogen because it leads to prolonged hospital stays and necessitates extra investigations, use of expensive drugs, intensive care, and may cause increase morbidity and mortality. Outbreaks of multidrug resistant and extensively drug resistant Typhoid have been reported worldwide.¹⁴

Limitations of our study include small sample size.

CONCLUSION

Salmonella typhi shows decreasing level of sensitivity to most antibiotics. Strict surveillance of antimicrobial use in all settings is the need of the hour to prevent further worsening of the current state of antibiotic efficacy in the treatment of *Salmonella* infections.



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AUTHORSHIP AND CONTRIBUTION DECLARATION

| No. | Author(s) Full Name | Contribution to the paper | Author(s) Signature |
|-----|---------------------|---|---|
| 1 | Ambreen Ahmad | Concept, Study design and data collection. |  |
| 2 | Islam Gul Afridi | Manuscript writing and references collection. |  |