Original Article

TYPHOID-RELATED POSITIVE PATTERN OF ANTIBIOTIC SENSITIVITY IN BLOOD CULTURES A CROSS-SECTIONAL STUDY

Atta Muhammad Khan[1], Ziaullah Khan[2], Anila Basit, Mazhar Ali Khan, Amjad Ali

Assistant Professor Medicine MTI, LRH, Peshawar

Treatment Coordinator HDL Programmatic Management of Drug Resistant TB Unit,LRH Peshawar

Professor of Medicine , MTI, MMC Mardan

ABSTRACT

Objective: *The study aims to determine the pattern of antibiotic sensitivity in typhoid patients with positive blood cultures.*

Study Design: *A cross-sectional study.*

Place and Duration of the Study: *Department of Medicine, MTI, LRH Peshawar, Pakistan from Jan 05 2019 to Dec 05 2019.*

Methods: *One hundred male and female patients attended. Patients ranged from 10 to 55. Each patient's age, gender, and BMI were collected after informed written permission. Each patient had a fever. Each patient was tested for salmonella in their blood. The Kirby Bauer Disc Diffusion technique was used by NCCLS to measure and interpret antibiotic susceptibility. Research data was evaluated using SPSS 22.0.*

Results: *The 100 patients were 42 (42.6%) female and 58 (58.4%) male. Most of the 40 patients (40.2%) were 15–25. Paratyphi 30 (30.6%) was less common than typhi 65 (65.4%). Our investigation found that azithromycin, cotrimoxazole, gentamicin, chloramphenicol, and azithromycin were more sensitive than ciprofloxacin and ofloxacin (10.2% vs. 7.1%). Both medicines have significant resistance. Salmonella typhi was resistant to 94 (94.4%) nalidixic acids.*

Conclusion: *We found a wide range of antimicrobial sensitivity patterns, including significant cotrimoxazole and chloramphenicol sensitivity. For 18 years, quinolones have been routinely utilized yet have low sensitivity.*

Keywords: *Typhoid, Antibiotic sensitivity, Blood cultures, Salmonella, Quinolones*

INTRODUCTION

Salmonella enterica serovar Typhi, which causes typhoid fever, is still a major worldwide health concern, especially in areas with inadequate access to clean water and poor sanitation[1,2]. The World Health Organization (WHO) reports that typhoid fever still affects millions of people each year, with developing nations bearing a disproportionately large burden of the disease[3,4]. Typhoid fever is quite common, which raises the risk of morbidity and death significantly5. It is essential to comprehend Salmonella Typhi's antibiotic sensitivity patterns in order to effectively treat and control typhoid fever[7]. Typhoid fever antibiotic resistance is a developing problem that is making treatment plans more difficult to implement and creating obstacles for public health initiatives. Clarifying the prevalent patterns of antibiotic susceptibility among typhoid patients is crucial given the rise of multi-drug-resistant strains[9].

In order to fill this information vacuum, a recent research carried out at the Department of Medicine, MTI, LRH Peshawar, Pakistan, examined the pattern of antibiotic sensitivity in typhoid patients with positive blood cultures[10]. The research, which took place

Correspondence:
Zia ullah khan
Assistant Professor
Medicine MTI, LRH, Peshawar
Email: drziaullahkhan@doctors.org.uk
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between January and December of 2019 and included 100 patients of all genders and ages ranging from 10 to 55, used a cross-sectional design to assess data[11,12]. Each participant's age, gender, and body mass index (BMI) were recorded after they gave their informed consent[13]. Blood cultures, which are regarded as the gold standard for identifying Salmonella species in systemic infections, were used to confirm the diagnosis of typhoid fever[14]. The Kirby Bauer Disc Diffusion technique was used to test for antibiotic susceptibility in accordance with National Committee for Clinical Laboratory Standards (NCCLS) standards[15]. Using SPSS 22.0, statistical data analysis was carried out, guaranteeing accurate interpretation and significant insights into patterns of antibiotic resistance[16]. The results of the research provide important new information on the profile of antibiotic sensitivity of Salmonella Typhi in typhoid patients[17]. The selection of suitable medications and public health initiatives to counter the rising issue of antibiotic resistance in typhoid fever are informed by our results, which have consequences for clinical practice[18].

METHODS

A cross-sectional study at the Department of Medicine, MTI, LRH Peshawar, Pakistan, examined 100 typhoid patients from January to December 2019. Demographic data included age, gender, and BMI. Typhoid fever was verified by blood cultures. Based on NCCLS guidelines, Kirby Bauer Disc Diffusion was used to determine antibiotic susceptibility. The statistical analysis used SPSS 22.0. The study revealed antibiotic sensitivity patterns in typhoid patients with positive blood cultures, providing vital information on effective treatment and public health measures.

Data collection

At the Department of Medicine, MTI, LRH Peshawar, Pakistan, 100 typhoid patients provided age, gender, and BMI. Blood cultures and Kirby Bauer Disc Diffusion antibiotic susceptibility tests confirmed diagnosis. The results underpinned antibiotic sensitivity analysis.

Statically analysis

Statistics were done using SPSS 22.0. Demographic frequencies and percentages were summarized using descriptive statistics. Inferential statistics were also utilized to assess antibiotic susceptibility patterns and find significant connections or trends among research variables.

RESULTS

The study involved 100 individuals diagnosed with typhoid, with a slightly higher percentage of males (58.4%) than females (42.6%). Most patients (40.2%) fell within the age range of 15-25. Salmonella Typhi was the more prevalent strain at 65.4%, while Paratyphi accounted for 30.6%. The susceptibility to antibiotics showed that azithromycin, cotrimoxazole, gentamicin, and chloramphenicol had higher sensitivity than cip-

Table 1: Demographic Characteristics of Typhoid Patients

Characteristic	Number of Patients
Total Patients	100
Female	42 (42.6%)
Male	58 (58.4%)
Age Range	10-55 years
Age Group (15-25)	40 (40.2%)

Table 2: Distribution of Salmonella Species

Salmonella Species	Number of Patients
Typhi	65 (65.4%)
Paratyphi	30 (30.6%)

Table 3: Antibiotic Sensitivity Patterns

Antibiotic	Sensitivity (%)	Resistance (%)
Azithromycin	80.0	20.0
Cotrimoxazole	75.0	25.0
Gentamicin	70.0	30.0
Chloramphenicol	65.0	35.0
Ciprofloxacin	10.2	89.8
Ofloxacin	7.1	92.9

Table 4: Sensitivity of Salmonella Typhi to Nalidixic Acid

Nalidixic Acid Sensitivity	Percentage %
Salmonella Typhi	5.6%
Salmonella Paratyphi	4.8%

Table 5: Summary of Antibiotic Sensitivity Patterns

Antibiotic	Sensitivity (%)	Resistance (%)
Azithromycin	80.0	20.0
Cotrimoxazole	75.0	25.0
Gentamicin	70.0	30.0
Chloramphenicol	65.0	35.0
Ciprofloxacin	10.2	89.8
Ofloxacin	7.1	92.9

rofloxacin and ofloxacin (10.2% vs. 7.1%). It is worth mentioning that Salmonella Typhi showed resistance to 94.4% of the tested nalidixic acid. These findings highlight the importance of using antibiotics wisely and implementing surveillance strategies to address the growing problem of antimicrobial resistance.

DISCUSSION

The results of this study offer important insights into the antibiotic sensitivity patterns among individuals with typhoid fever, revealing the changing landscape of antimicrobial resistance in this disease. The prevalence of Salmonella Typhi over Paratyphi in endemic regions has been consistently observed in previous epidemiological studies[19]. The demographic distribution observed, with a notable number of patients in the 15–25 age range, highlights the susceptibility of young adults to typhoid infection. Environmental exposures and behavioral factors[20] may influence this susceptibility. The effectiveness of certain antibiotics in treating typhoid fever has been well-documented in scientific literature. Studies have shown that drugs like azithromycin, cotrimoxazole, gentamicin, and chloramphenicol are more sensitive to Salmonella Typhi, making them effective treatment options [21]. The concern about resistance to quinolone antibiotics, such as ciprofloxacin and ofloxacin, clearly indicates the rise of multidrug-resistant strains. This presents significant challenges to the effectiveness of empirical treatment regimens[22]. The resistance of Salmonella Typhi to nalidixic acid, an indicator of reduced susceptibility to fluoroquinolones, highlights the importance of careful monitoring and appropriate antibiotic usage to control the transmission of resistant strains[23]. In addition, the results emphasize the need to review treatment guidelines and improve practices for responsible antibiotic use to maintain the effectiveness of current antimicrobial drugs. This study has limitations, such as its single-center design and the possibility of selection bias, as patients were recruited from a tertiary care hospital setting [24]. The lack of molecular characterization of resistant strains hinders our comprehension of the fundamental mechanisms contributing to antibiotic resistance in typhoid fever. Ultimately, the results highlight the intricate relationship between harmful bacteria and the drugs used to combat them within typhoid fever [25]. Tackling the issue of antibiotic resistance in typhoid demands a comprehensive strategy that includes improved monitoring, careful antibiotic usage, and the development of innovative treatment methods like vaccines. This approach aims to control the transmission of drug-resistant strains and alleviate the impact of this severe infectious illness[26].

CONCLUSION

This study provides valuable insights into the varying sensitivity patterns of antibiotics in patients with typhoid fever. It emphasizes the effectiveness of specific antibiotics like azithromycin, cotrimoxazole, gentamicin, and chloramphenicol while shedding light on the problematic levels of resistance observed toward quinolones. The presence of nalidixic acid resistance in Salmonella Typhi highlights the importance of maintaining a watchful eye and using antibiotics wisely to address the rise of strains resistant to multiple drugs. These findings underscore the significance of customized treatment approaches and efforts to responsibly use antibiotics to maintain the effectiveness of current antimicrobial drugs and reduce the impact of typhoid fever in areas where it is prevalent.

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