Culture And Sensitivity Of Salmonella Species: Analysis of a TwoYear Data

Ayesha Saqib (Fourth year medical student, Ziauddin Medical University, Karachi.)
Altaf Ahmed (Department of Microbiology, Ziauddin Medical University, Karachi.)

Abstract

Objective: To determine the proportion and culture/sensitivity (C/S), pattern of different species of Salmonella in blood sent for C/S in a laboratory at a tertiary care hospital.
Material and Methods: A retrospective analysis was done on all blood samples sent for C/S to the laboratory of Ziauddin Medical University Hospital during two years period (Jan 1, 1998 to Dec 31, 1999). 9035 blood samples were received for C/S. All blood cultures were inoculated in thioglycolate broth and incubated at 37° for 7 days. Positive blood cultures were processed, colonies were identified using standard biochemical tests and antibiotic susceptibility was checked by Kirby- Bauer disc diffusion method.
Results: Three hundred and four (3.4%), out of 9035 blood cultures were positive for Salmonella, among them 220 (72%) were S.typhi, 82 (27%) paratyphi Aor B and remaining were other species. Salmonella infection was more common in male (58%) and more prevalent in children under 10 years of age (58%). Ampicillin, chioramphenicol, cotrimoxazole resistance was (46.5%), (39.3%) and (44.8%) respectively.
Conclusion: Ampicillin chloramphenicol and cotrimoxazole, the first line of drugs for the treatment of infection are loosing their efficacy and most of the organisms have developed resistance against these drugs (JPMA 50:282, 2000).

Introduction

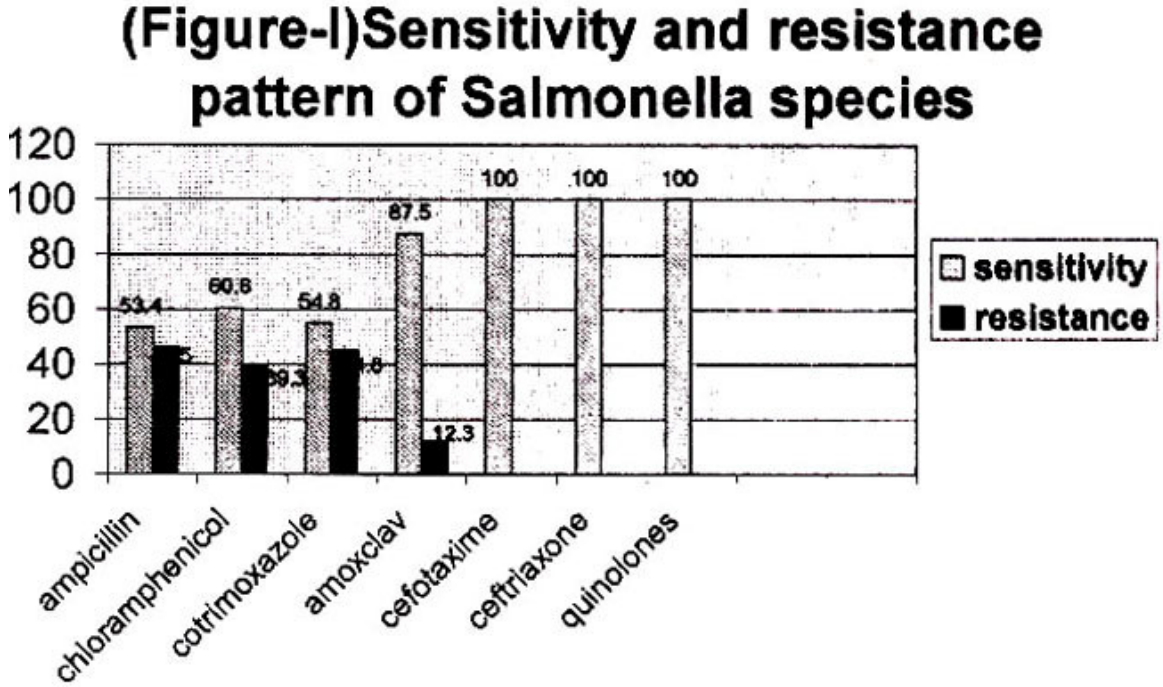
Typhoid and Para-typhoid fevers are endemic in the Indo Pakistan subcontinent, South and Far East Asia, Middle East, Africa and central and South Africa[1].The epidemiology of Salmonella infection is related to the ingestion of food and water contamination by human and animal wastes. Lack of chlorination, equipment failure and back- siphonage in the water distribution system led to contamination of drinking water[2]. Therefore it is particularly prevalent in developing countries, where public health education is less and people are not able to maintain personal and communal hygiene[3].
Typhoid is a severe debilitating and potentially life threatening illness. It is generally one of the most challenging problems in medical therapeutics as this infection is significant cause of morbidity and mortality in affected population.
Initiation of appropriate antibiotic, depending on local sensitivity pattern is needed early in the disease to avoid mortality and morbidity[4]. A major concern is the emergence of multi drug resistant typhoid fever, which was first reported in 1987 in Pakistan[5]. After this there has been a gradual increase in this strain, which has made first line drugs ineffective for treatment. Many reports from developing countries show that the clinical presentation, diagnosis and treatment of typhoid have significantly altered[6,7] therefore, its antibiotic susceptibility requires reappraisal from time to time.

Material and Methods

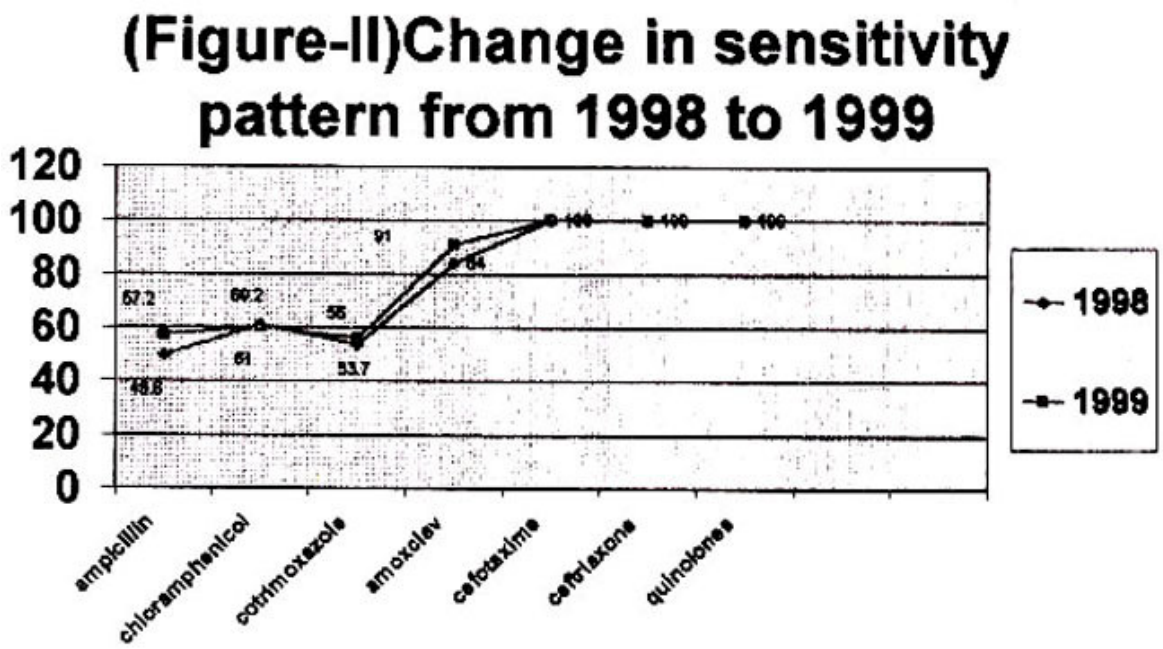
Nine thousand and thirty five blood samples for culture and sensitivity were received from inpatients, outpatients department of Ziauddin Medical University Hospital during the period of January01, 1998 to December 31, 1999. All blood cultures were inoculated in thioglycolate broth and incubated at 37°C for 7 days. Positive blood cultures were processed, colonies were identified using standard biochemical tests and antibiotic susceptibility was checked by Kirby - Bauer disc diffusion methods[8].
All the Salmonella isolates were tested for their susceptibility against ampicillin (AMP) chioramphenicol, cotrimoxazole, amoxicillin plus clavulunic acid, quinolones, cefotaxirne and ceftriaxone. The susceptibility or resistance was judged on the basis of measurement of zone of growth inhibition around individual disc.

Results

Salmonella species were isolated from 304 (3.4%) samples, of these predominant isolates were S.typhi 220 (72.3%); others were S. paratyphi A or B 82 (27%) and other species. There were 175 (58%) male and 129 (42%) female patients. Infection was more prevalent in children, 175 (58%) under len years of age. Minimum age found positive for infection was one month. Most of the patients, 166 (55%) were admitted for treatment.
The results of antimicrobial sensitivity showed that sensitivity against ampicillin, chloramphenicol and co trimoxazole was (53.4%), (60.6%) and (54.8%) respectively (Figure 1).



All the species were uniformly sensitive to quinolones, cefotaxime and ceftriaxone. It was observed that most of the S. typhi strains were resistant to first line of drugs .C/S pattern of year 1998 and 1999 were compared (Figure 2).



No significant difference was found.

Discussion

Typhoid fever is one of the most common infections in Karachi. Last 10 years have witnessed the increasing numbers S. typhi isolated from blood and bone marrow cultures[9]. There is no doubt that typhoid will remain endemic as long as lack of economic development allows the organisms to flourish. It has been estimated that 33 million cases and 500,000 deaths occur annually throughout the developing world due to typhoid fever with a world wide incidence of 540/100,000 (0.5%) in the developing world .In countries like Japan and U.S.A where a reliable system of reporting exist, the annual incidence is 0.24-37/100,000 population[10].

Low proportion of blood C/S positive for Salmonella in this study (3.4%) is comparable to other studies[11],which could be due to improper sample collection or prior use of antibiotics. It was seen that most of the reported cases were from admitted patients, which shows that morbidity is very high for this infection.

The findings of this study which are similar to other studies[12-14], show that majority of cases of typhoid fever in Pakistan are due to Salmonella typhi or paratyphi AWhile those in western population are due to S.paratyphi A, B, or C[15]. Typhoid fever was more prevalent at the age of one to ten, as the highest risk of infection is present in preschool and school going children[16]. This situation is likely to continue in our country because of the lack of basic facilities like safe drinking water and proper disposal of human excreta.

Majority of the findings in this study were similar to those reported[12,16,17], with most of the isolates having developed resistance against the first line of drugs. It is thought that increase in resistance rate to ampicillin, chioramphenicol and cotrimoxazole is due to unrestricted antimicrobial use in our country[16]. And now most of the physicians prefer quinolones and third generation cephiosporins, which are very expensive .The only hope for the treatment of typhoid fever in adults lies in quinolones which are relatively cheaper. Hence it is strongly recommended that the use of these antibiotics should be restricted to patients having a definitive indication, so that we may use them for a longer time.

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