Original Research Article

Clinico-epidemiological profile of enteric fever at a peripheral health centre in Kashmir valley

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Abstract

Enteric fever commonly known as typhoid fever remains endemic in many developing countries with an estimate of more than 26.9 million cases recorded annually with 1% associated deaths. We conducted a study to evaluate clinico-epidemiological profile of enteric fever in a peripheral hospital of Kashmir North India. This was a hospital based cross sectional study conducted over a period of one year including a total of 100 patients between 1-12 years of age. All children who have documented fever of more than one week duration with widal titres of >160 were included in the study. Among 100 patients included in the study 94% had fever of >1 week of duration, 68% and 50% had anorexia and vomiting respectively. Diarrhea was present in 28% of the study population with constipation in 10%. 28% had hepatomegaly on examination while as 12% had spleenomegaly. Headache was present in 17% of population. Our study concluded that enteric fever continues to be a significant cause of morbidity and mortality in developing nations especially in the rural population. Poor hygiene, lack of proper community education, limited healthy care facilities and negligible typhoid vaccination are the main concerns which need to be addressed on priority to decrease the disease burden.

Key words

Enteric fever, Headache, *Salmonella typhe*.

Introduction

Enteric fever remains endemic in many developing countries and is caused by Salmonella enterica serovar typhi. It is estimated that 26.9 million typhoid fever cases occur annually with 1% mortality rates [1]. The vast majority of this disease burden is witnessed in Asia. In developed countries the incidence is <15 cases / 100000 population and the cases most commonly occur in travelers. In contrast the incidence in developing countries ranges from 100-1000 cases/100000 population. There are significant differences in the age distribution and population at risk [2]. Population based studies from south Asia indicate that the age specific incidence of typhoid fever may be highest in children <5 years of age and is associated with higher rates of complications and hospitalization [3]. The incubation period of typhoid fever is 10-14 days but may range from 3-21 days. The clinical presentation varies from a mild illness to severe picture of multi organ failure [4]. Many factors which influence the severity and outcome of infection include duration of illness, age of the patient, vaccination status, virulence of bacterial strain, quantity of inoculum ingested, choice of antimicrobial therapy and immune status of the host. There is emerging evidence from South Asia that the presentation of typhoid fever may be more dramatic in children <5 year of age with higher rate of complications including disseminated intravascular coagulation (DIC) [4, 5]. Typhoid fever usually manifests as high-grade fever associated with generalized aches, abdominal pain, diahorrea, hepatoplenomegaly and anorexia in children [6]. In approximately 25% of cases a macular rash (rose spots) may be visible by around 7^{th} to 10^{th} day of illness usually seen on lower chest and abdomen. The main stay of diagnosis is a positive blood culture which ha sensitivity of 70-80 % in the early course of disease. Stool and urine cultures may be positive after the second week of illness. Culture can be also taken from rose spots and bone marrow which have an advantage of not being altered much by prior use of antibiotics [7]. The blood picture usually shows leucopenia but in younger children leucocytosis is common and may reach up to 25000/µl. Thrombocytopenia may be a marker of severe illness and may accompany DIC [8].

The classic widal test measures antibodies against O and H antigens of *S. typhi* but lacks sensitivity and specificity in endemic areas [9, 10]. Other relatively newer diagnostic tests using monoclonal antibodies have been developed which directly detect *S. typhi* specific antigen in the serum or urine. However few have proved sufficiently robust in large scale evaluation. A nested polymerase chain reaction (PCR) analysis using H1-d primers has been used to amplify specific genes of *S. typhi* in the blood of patients. It is a promising means of making a rapid diagnosis especially given the low level of bacteremia in enteric fever. Typhoid fever is notable for the emergence of drug resistance. There is also a considerable increase in nalidixic acid-resistant and even ceftriaxone-resistant isolates of *S.typhi*, as well as the emergence of fluoroquinolone resistant isolates [11]. Direct or indirect contact with an infected person (sick or chronic carrier) is a prerequisite for infection. Ingestion of food or water contaminated with *S. typhi* from human faeces is the most common mode of transmission. In other parts of the world oysters and other shell fish cultivated in water contaminated by sewage and the use of night soil as fertilizer may also cause infection.

Materials and methods

Inclusion criteria

All children from 1 to 12 years of age with documented fever > 1 week duration and widal titres > 160.

Exclusion criteria

Those with fever <1 week duration, requiring intensive care, widal titres <160, complicated enteric fever were excluded from study

Diagnosis of eneteric fever was done by clinical examination and widal test.

Widal test showing titres for antigen H and/or O > 1:160 was taken as positive for enteric fever. Further all data was analyzed statistically using SPSS software and Microsoft excel.

Results

A total of 100 patients from 1 to 12 yrs of age were studied. The mean age (SD) at presentation was 5.2 (2.1) years (**Table - 1**). 45% of the patients were males and 55% were females (**Table - 2**).

Table - 1: Age distribution of cases (n=100).

Age (years)	N	%
1-3	15	15
3-6	40	40
6-12	15	15
Total	100	100
Mean ± SD	5.2±2.1	

Table - 2: Sex distribution of cases (n=100).

Sex	Number	Percentage
Male	45	45
Female	55	55
Total	100	100

Table - 3: Other demographic variables.

Variable	Number	%
Socioeconomic class		
Upper	10	10
Upper middle	15	15
Lower middle	12	12
Upper lower	28	28
Lower	35	35
Geographical area		
Hilly	60	60
Plains	40	40
Previous history of enteric fever		
Yes	55	55
No	45	45
Family history of enteric fever		
Yes	5	25
No	95	75
Vaccination status		
Vaccinated	0	0
Not vaccinated	100	100

Among other features it was observed that as per modified Kuppuswamy scale (updated in 2021), 35% patients belonged to lower socio economic class whereas 28%, 12%, 15% and 10 belonged to lower, lower middle, upper middle and upper classes respectively (**Table - 3**). It was also found that 55% had previous history of enteric fever and 25% had family history if enteric fever. Among 100 patients 60% belonged to hilly areas and 40% were residing in plain areas. Also none of the patients was vaccinated against *Salmomella*. Clinical profile of cases was as per **Table – 4**. Widal titre results in patients were as per **Table – 5**.

Table - 4: Clinical profile of cases (n=100).

Characteristic	Number (%)
Fever(>1 week)	94 (94%)
Vomiting	50 (50%)
Anorexia	68 (68%)
Pain abdomen	20 (17%)
Constipation	10(10%)
Diarhea	15(15%)
Hepatomegaly	28(28%)
Spleenomegaly	12(12%)
Headache	17(17%)

Table – 5: Widal titre results in patients.

Titre levels	1:160	1:180	1:320
% of patients with Salmonella typhi "O"	20%	35%	45%
% of patients with Salmonella typhi "H"	24%	36%	40%

Discussion

Enteric fever is one of the most common causes of fever of unknown origin in children. Most of the cases continue to be caused by salmonella typhi. Enteric fever is still widely prevalent in developing countries with a significant burden on pediatric age group. Poor hygiene, lack of proper community education, lack of proper health facilities as well as indiscriminate use of antimicrobials has lead to increased morbidity and mortality rates due to enteric fever.

Many patients develop complications like intestinal hemorrhage, myocarditis, meningitis, orchitis etc; adding further to its morbidity as well as mortality in children. The fever with anorexia is the most common symptoms of

enteric fever that worsen the nutritional status in already malnourished children of developing countries. Moreover the complications occurring due to inadequate treatment as well as increasing drug resistance adds further to the morbidity and mortality especially in rural setups of Kashmir. Our study was a hospital based cross sectional study done in a peripheral center of Kashmir. This study helps us to further deepen our understanding regarding enteric fever so to help pediatricians, physicians and other health workers to diagnose enteric fever at early and prevent young children from developing dreadfull complications and also prevent indiscriminate use of antibiotics.

In our study we found that majority (40%) of the children were in the age group between 3-6 years. In our study we found that 45% patients were males and 55% were females 35% patients belonged to lower socioeconomic class reflecting the poor hygienic lifestyle responsible for transmission of enteric fever. Our findings were consistent with study done by Mangal, et al., [12]. Further our study found that 25% patients had previous history of enteric fever showing inadequate antibiotic treatment for enteric fever. Our study also found that 5% patients had family history of enteric fever and no patient was vaccinated for enteric fever. Our findings were in consistent with study done by Mukherjee P, et al. [13]. Further in our study we found that fever was the most common complaint followed by anorexia, vomiting and pain abdomen (**Table - 4**). Our findings were consistent with the study done by S.C Sood, et al. [14]. Further we found that those patients with higher widal titres >180 had more severe clinical course than those with lower widal titres. These findings were consistent with those of Karkey, et al. [15].

Conclusion

Our study concluded that enteric fever continues to be a significant cause of morbidity and mortality in children in rural areas of Kashmir. Poor hygiene, lack of proper community education, lack of proper health facilities, negligible typhoid vaccination coverage as well as indiscriminate use of antimicrobials has lead to increased morbidity and mortality rates due to enteric fever. This study aims to help practioners to acquire more and updated knowledge on enteric fever so that to help them to diagnose enteric fever at early and prevent young children from developing dreadfull complications and also prevent indiscriminate use of antibiotics.

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