Clinical Profile of Typhoid Fever in Children in Northern Areas of Bangladesh

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The present cross-sectional study was carried out at Pediatrics Department of Rangpur Medical College Hospital. In paediatric patients of 1-14 years, diagnosed primarily as typhoid fever, were the study population. The diagnostic criteria were the clinical presentations suggestive of typhoid fever with either positive blood culture for Salmonella or a fourfold rise in antibody titre. A total of 50 subjects were selected as study population. The mean age of the patients was 7.9±3.7 years and male to female ratio was 1.1:1. The mean duration of illness was 13.8 days, the lowest and highest durations of illness were 8 and 21 days respectively. All patients had fever (58% step-ladder pattern & 42% intermittent type). Patients having headache were 64%. Majority (94%) complained of loss of appetite, 88% had nausea/vomiting, 24% had abdominal pain, 38% had diarrhea, 24% had constipation and 26% had cough. On examination, common signs were relative bradycardia (42%), abdominal tenderness (34%), hepatomegaly (38%), splenomegaly (16%).18% exhibited coated tongue and toxic condition were noted in 6% of the patient. Widal test showed that in 32% of patients TO titres increased to 4-fold, 20% to 8- fold & 4% to 16-fold. Blood culture report showed that 14 (28%) cases were culture positive. The study concluded that current clinical pattern of typhoid fever in children in northern areas of Bangladesh is similar with our study.

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Key words: Blood culture, Salmonella, step-ladder, Multidrug resistant.

Introduction

Typhoid fever is a commonly encountered systemic disease caused by the gram negative bacteria Salmonella enteric serover typhi.[1] For the developing countries of the tropics and subtropics, it continues to be a big public health problem as the sanitation and public health standards are poor.[2] Typhoid fever is endemic in the South East Asian countries.[3,4] Above 22 million new cases occur each year round the world while 90% of the sufferers are from the South-East Asia. Reported deaths from typhoid fever accounts to around 2,16,000 per year.[5-7] Effective treatment of enteric fever dates back to 1948, when Woodward introduced chloramphenicol.[8,9] Subsequently ampicillin and co-trimoxazole made worthwhile contribution in the field and changed the outlook as gold standards of treatment, when case fatality came down to almost one percent. However,

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chloramphenicol resistant strains made their appearance and a big change in the scenario of typhoid fever was observed during the 1970s.[10-12] Multidrug resistant strains of S.typhi with plasmid mediated gene transfer against the first line drugs is a frequent finding in these days.[12,13] Fluroquinolones, the second line option are also becoming resistant through the chromosomal mutation in DNA-gyrase system of S.typhi.[14,15] In Bangladesh, typhoid fever is a round the year problem which sometimes take epidemic proportions. From the public health point of view the reason behind such occurrence are unsafe water supply, defective sewerage system and unhygienic food handling practice.[17] Antibiotics are sold over the counter causing inappropriate and indiscriminate use in febrile illness. Drug resistance in typhoid fever is a likely outcome of such misuses. A high incidence of multidrug resistant (MDR) typhoid fever has been reported from Bangladesh. Variation in the sensitivity pattern to the first line drugs was observed in separate studies conducted in Dhaka and Khulna.[13,18] The MDR strains showed up with a changed clinical pattern and a higher rate of complications (20%).[8,15] It has been observed that the overall scenario of the disease changed with time. The diagnostic and treatment modalities undergoing revisions and changes periodically. Many reports from developing countries showed that the clinical presentation, diagnosis and treatment of typhoid fever have significantly altered often leading to missed diagnosis.[16] The present approach is thus an attempt to update our knowledge about the disease, so that time required changes can be made in the diagnosis and treatment of typhoid fever.

Methods

This study was cross sectional, carried out at paediatric department of Rangpur Medical College Hospital over a period of 2 years from January 2011 to December 2012. Fifty paediatric patients of age 1-14 years, diagnosed primarily as typhoid fever were our study population. Patients were diagnosed by clinical presentation suggestive of typhoid fever with positive blood culture for salmonella or a fourfold rise in antibody titre.[17] Typhoid patients above 14 years of age with any other co-morbidities were excluded from the study.

Results:

The finding of the study derived from data analysis are presented below. Table I shows that over half (52%) of the patients were between 5-10 years, followed by 20% below 5 years and 28% were above 10 years of age. The mean age of the patients were 7.9±3.7 years and the lowest and highest were 1 & 14 years respectively. Sex distribution of the patients shows that out of 50 patients 26 (52%) were male & 24 (48%) were female giving a male to female ratio of 1.1:1.

Table I: Age distribution of patients (n=50)

Age Group(Years)*	Frequency	Percentage
<5	10	20
5-10	26	52
>10	14	28

* Mean age = (7.9±3.7) years; range=(1-14) years

Table II. Distribution of patients by duration of illness. (n=50)

Duration of illness (days)*	Frequency	Percentage
8-14	34	68
>14	16	32

* Mean duration of illness =(13.8±3.4) days; range = (8-21)days.

Table II shows that over half (68%) of the patients at presentation had been suffering

from the disease for 8-14 days, & the rest 32% above 14 days. The mean duration of illness was 13.8 ± 3.4 days and the lowest & highest duration of illness was 8 and 21 days respectively.

Table III: Temperature profile of the patients (n=50)

Temperature	Frequency	Percentage
≤100	04	08
101-102	34	68
≥103	12	24

*Mean temperature = $(101.7\pm1)^0$ F.

All patients had fever. Of the total patients 21 (42%) had intermittent fever while the rest 29 (58%) had step-ladder pattern of fever. 68% of patients exhibited a temperature ranging from 101-102^0 F, 24% exhibited 103^0 F or more and 8% showed 100^0F or less. The mean temperature of the patients were observed to be $(101.7\pm1)^0$F (Table III).

Table IV: Overall clinical presentation of the patient (n-50)

Clinical presentation	Frequency	Percentage
Symptoms		
Fever	50	100
Abdominal pain	12	24
Headache	32	64
Anorexia	47	94
Nausea/Vomiting	44	88
Diarrhoea	19	38
Constipation	12	24
Cough	13	26
Arthralgia	5	10
Myalgia	7	14
Weakness	30	60
Signs		
Coated Tongue	9	18
Hepatomegaly	19	38
Splenomegaly	8	16
Relative bradycardia	21	42
Abdominal tenderness	17	34
Rales	02	04
Toxic	03	06
Other	03	06

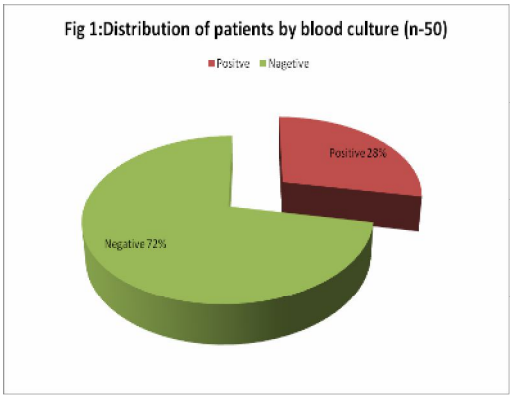
Table IV shows 64% Patients had headache, 94% complained of loss of appetite, 24% had abdominal pain, 88% nausea & vomiting, 38% diarrhoea, 24% constipation & 26% cough. On examination common signs were relative bradycardia (42%), abdominal tenderness (34%), hepatomegaly (38%), splenomegaly (16%), 18% exhibited coated tongue & toxic condition were noted in 6% of the patients. Other 6 patients had atypical presentation, of them 2 (4%) had arthralgia, one had burning micturition, 2 had altered consciousness & one had pneumonitis.

Table V: Association between temperature and bradycardia (n=50)

Temperature	Bradycardia		p-value
	Present (n=21)	Absent (n=27)	
100-102^0F	13(60.50%)	23(86%)	0.001
>102^0 F	8(39.5%)	4(14%)	

Data were analyzed using Chi-square (X^2) Test & p values <0.05 was considered as statistically significant (95% confidence limit).

Table V shows association between temperature & pulse, demonstrated that about 40% of the patients with bradycardia had a temperature of >102^oF compared to 14% of those who did not have bradycardia suggesting that relative bradycardia is a significant feature of the disease (p=0.001).



Blood culture report showed that only 14(28%) cases were Salmonella positive & the rest (72%) were negative (Fig-1).

Discussion

Salmonella typhi infection remains a major problem in developing countries. It continues to be a major cause of morbidity and mortality in tropical countries, especially among children.[18,19] The clinical profiles of typhoid fever are various and atypical manifestation often makes a diagnostic problem, especially in childhood. The present study was conducted to assess the current pattern of typhoid fever. In our study we found mean age of the patients to be 7.9±3.7 years and the lowest and highest ages were 1 and 14 years respectively and the male to female ratio of roughly 1.1:1. The mean duration of illness was 13.8 ±3.4 days and the lowest and highest durations of illness were 8 and 21 days respectively. Majority (58%) had step-ladder pattern of fever. 68% of patients exhibited a temperature ranging from 101-102^0 F & 24% exhibited 103^0 F or more. The association between temperature and pulse rate demonstrates that about 39.5% of patients with bradycardia had a temperature> 102^0F compared to 14% of those who did not have bradycardia (p=0.016+). The classical typhoid fever is characterized by insidious onset of sustained fever, severe headache, malaise, abdominal pain, non productive cough, a relative bradycardia & hepatosplenomegaly (50%).[20] Common features of typhoid fever found in another study of Haq et all (1997) were step-ladder pattern of rise of temperature, loose motion, relative bradycardia & coated tongue. Consistent with the findings of this study, we found step-ladder pattern of fever (58%), loss of appetite (94%), coated tongue (18%), nausea/vomiting (88%), diarrhea (38%), relative bradycardia (42%), Hepatomegaly (38%), splenomegaly (16%). Thus most of the patients in the present series had classic presentation. Atypical manifestations in nearly half (49.9%) of the total culture positive cases (n=32) were observed in a study.[21] Atypical manifestations were burning micturition with normal urine examination (15.6%) diarrhea (6.2%) and encephalopathy (3.1%) in the first week, isolated hepatomegaly (6.2%), pneumonitis (3.1%) & bone marrow depression (6.2%). They reported that out of 32 salmonella typhi culture positive patients, 10 (31.3%) patients had multidrug resistant (MDR) strain. However, patients with MDR strain had atypical manifestations (50%), not significantly more than the patients having multidrug sensitive strains (45.5%).[21] School-children were the most affected. Children in this series commonly presented with fever, headache, gastrointestinal symptoms, and diarrhea was more common than constipation in this study, which is in accordance with the results from other studies.[22,23] Though the gold standard for the diagnosis of typhoid fever is isolation of S. typhi from blood, bone marrow, stool, urine or any other body fluid. In resource limited countries like Bangladesh isolation of organism is often jeopardized due to lack of facilities or improper antibiotic use prior to culture. For this reason laboratory diagnosis of S. typhi infection relies mostly on serological test, Widal test.[24] On the basis of cut off value for TO (1:80) & TH (1:160) and considering both the agglutinin equally important, sensitivity and specificity of the test were 89% and 97% respectively. Moreover, it lacks sensitivity and specificity in endemic area.[25]

Conclusion

The clinical pattern of typhoid fever conforms with that of classic pattern. Very few cases had atypical manifestations. If a school going child presents with high grade fever of 7-14 days duration, associated with toxicity, abdominal pain, nausea, diarrhea, constipation, coated tongue, hepatomegaly or splenomegaly, we can have strong suspicion of typhoid fever till investigations prove it or where laboratory facilities are not available.

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