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Clinical profile and treatment outcome of typhoid fever in children: A study in Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh

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Abstract
Introduction: Salmonella typhi is responsible for the occurrence of enteric fever, which is likely a fatal multisystemic disorder. The diagnosis of typhoid fever is challenging because of the diversified clinical manifestations. It is a major public health problem in Bangladesh. The incidence of enteric fever can be regarded as an index of sanitary measure practiced in our country. However, the diagnosis most often remains either as an unsubstantiated clinical impression or a serological diagnosis and occasionally confirmed by blood culture.
Objective: To evaluate the varied clinical presentations, complications, and prognosis of enteric fever.
Materials and Methods: A prospective study was done at Renal & Dialysis Unit to study the clinical profile of enteric fever for a period of 1 year from November 2015 to October 2016. In this prospective study, 98 consecutive serological or culture positive cases of enteric fever were studied. A detailed history, clinical profile, and complications encountered at the time of admission and during the course of stay in the hospital were recorded.
Results: Of the 98 children, 54 (55.10%) were girls and 44 (44.90%) boys, with the male: female ratio of 0.81:1. None of the patients included in the study had taken typhoid vaccine in the past. Leukopenia was seen in 11.2% and leukocytosis in 17.4% patients. Lymphocytosis was observed in 70.4% patients. The most common symptoms were fever (100%), abdominal pain (57.14%), vomiting (50%), and anorexia (30.61%), and cough (13.26%). The most common signs observed in patients by the pediatrician were toxic look (92.85%), coated tongue (66.32%), pallor (39.79%), hepatomegaly (36.73%), and splenomegaly (20.40%). The mean duration of hospital stay was 6.4 ± 0.86 days, and there was no mortality in our series. Most of the patients responded to treatment with 3rd generation ceftriaxone (91.84%). Complications of typhoid fever were seen in 8.16% of patients. None of the patients included in the study had taken typhoid vaccine in the past.
Conclusion: Endemicity, outside eating, poor sanitation, and poor personal hygiene were the commonest observed causative factors. So, public awareness about safe drinking and feeding practices, proper sanitation, and hygiene is the most useful preventive measure to prevent morbidity from typhoid fever.

Keywords: Clinical profile, treatment outcome, typhoid fever, Bangladesh

1. Introduction
Salmonella typhi (S. typhi) is a Gram-negative bacterium that causes typhoid, which is a preventable, communicable disease and still a major global threat to public health. In spite of immunization, estimates for the year 2000 suggested that there were over 2.16 million episodes of typhoid occurrences worldwide resulting in 216,000 deaths with more than 90% of morbidity and mortality from Asia [1]. Ochiai *et al*., [2] in their review of disease burden owing to typhoid from five Asian coun-tries, reported a higher incidence of typhoid fever from Bangladesh, Indonesia, and Pakistan. Although the incidence of typhoid has decreased markedly in the developed country, it is still high in the developing countries. Morbidity owing to typhoid ranges from 107 to 229 per 100,000 people in Bangladesh [3]. Improved standard of public health has resulted in a decline of the inci-dence, but there is still a chance of improvement. Ingestion of food or water contaminated with human feces is the common mode of transmission. Water-borne outbreak owing to poor sanitation and direct fecal–oral spread owing to poor personal hygiene are encountered most often. Until 1948, the gold standard antimicrobial agent for the treatment of typhoid was believed to be chloramphenicol [4]. But, in the last two dec-ades, the resistance of strains of *S. typhi* to chloramphenicol has increased. *S. typhi* resistant to chloramphenicol was first reported from Britain in 1950 [5], and from Bangladesh, the resistance was reported since 1972 [6]. After that, an increasing frequency of antibiotic resistance has been reported from all parts of the world, but more so from the developing countries [7], This may be owing to the irrational use of antibiotics. In endemic areas such as Bangladesh, book picture of signs and symptoms in enteric fever are not often seen. This may be owing to the widespread and indiscriminate use of antimicro-bials and antipyretics, which also contributes to the develop-ment of some unusual or atypical presentations of enteric fever and antibiotic resistance in our country. Unusual manifes-tations lead to diagnostic dilemma and delay in diagnosis of the disease. This study was concerned with the evaluation of varied clinical presentations, complications, and prognosis of enteric fever.

2. Materials and Methods

A prospective study was done at a Renal & Dialysis Unit Dhaka *Shishu (children) hospital, Dhaka, Bangladesh to* study the clinical profile of enteric fever for a period of 1 year from November 2015 to October 2016. Throughout this period, all the patients who were admitted with clinical diagnosing of typhoid fever were investigated for agglutination test and blood culture. 98 childs World Health Organization were positive for either take a look at where enroled within the study. Clinical diagnosing was done by the pediatricians. a close history, clinical profile, treatment history, and complications encountered at the time of admission and through the course of keep in hospital were recorded with consent from the fogeys of patients The inclusion criteria were as follows:(1) patients aged 1:120 to each "O" and "H" substance or positive blood culture for S. typhi. The exclusion criteria were as follows: (1) patients aged >12 years admitted within the paediatric department and (2) positive blood serum Widal test: titre of >1:120 to each "O" and "H" substance and positive blood culture for S. typhi. The exclusion criteria were as follows: (1) patients aged >12 years admitted within the pediatric medicine department, (2) patients whose oldsters didn't offer consent, and (3) patients World Health Organization left the hospital against medical recommendation. Knowledge were entered in Microsoft stand out and analyzed victimisation Epi-Info seven.1.5. Continuous variables were expressed as mean and Coyote State. Categorical variables were expressed as percent- ages. Acceptable applied math tests were applied consequently. A p price but zero.05 was thought of as important.

3. Results

During the study amount, 104 children were clinically diagnosed with typhoid fever. On laboratory investigation, ninety eight children were found positive for either agglutination test or blood culture or positive for each the tests. So, the clinical profile of ninety eight indoor patients was ascertained throughout the course of hospital keep. Of the ninety eight children, 54 (55.10%) were ladies and forty four (44.90%) boys, with the male: feminine quantitative relation of zero.81:1. Of the ninety eight patients enclosed within the study, solely 2 (2.04%) patients discovered a history of infectious disease. cardinal patients were exploitation water from municipal water system and solely 2 patients exploitation bore well water. cardinal (32.7%) patients showed history of edge ingestion. None of the patients enclosed within the study had taken infectious disease immunogenic within the past [Table 1]. Leucopenia was seen in eleven.2% and blood disease in seventeen.4% patients. Blood disease was ascertained in seventy.4% patients. during this study, forty eight (49%) patients showed delicate anemia, 19 (19.4%) patients moderate anemia, and solely 2 (2%) patient's severe anemia [Table 2]. during this study, fever was the chief gifting criticism present altogether the patients (100%). the opposite most typical symptoms were abdominal pain (57.14%), inborn reflex (50%)

Table 1: Basic variable of patients (N=104).

Variable	Number of patients	Percentage
Age (years)		
1-10 yrs.	31	31.63
10-12 yrs.	67	68.37
Sex		
Female subjects	54	55.10
Male subjects	44	44.90
History of typhoid	2	2.04
History of roadside eating	38	38.78
Water supply source		
Municipality water supply	96	97.96
Bore well	2	2.04

Table 2: Laboratory results in patients (N=104).

Laboratory test	Number of patients	Percentage
WBC count mm3	11	11.2
4,000–11,000 mm3	70	71.4
mm3	17	17.4
% of lymphocytes in WBC	69	70.4
Laboratory tests for typhoid	29	29.6
Blood culture positive	4	4.10
Widal test positive	96	97.96
Both the tests positive	3	3.06
Hb level (g/dL)	2	2
7–8.9	19	19.4
9–11	48	49
	29	29.6

Table 3: Presenting symptoms of patients (N=104).

Symptoms	All patients (*n* = 98), *n* (%)		Patients aged < 5 years (*n* = 31), *n* (%)		Patients aged > 5 year (*n* = 67), *n* (%)	
Fever	98	(100)	31	(100)	67	(100)
Abdominal pain	56	(57.14)	16	(51.61)	40	(59.70)
Vomiting	49	(50)	15	(48.38)	34	(50.74)
Anorexia	30	(30.61)	8	(21.05)	22	(32.83)
Cough	13	(13.26)	5	(13.15)	8	(11.94)
Body ache	4	(4.08)	3	(9.61)	1	(1.49)
Headache	3	(3.06)		0	3	(4.47)
Constipation	2	(2.04)		0	2	(2.98)
Irritability	1	(1.02)		0	1	(1.49)
Aphasia	1	(1.02)		0	1	(1.49)
Convulsion	1	(1.02)		0	1	(1.49)

A Multiple symptoms are possible.

Table 4: Signs positive in child patients (N=104).

Signs	All patients (*n* = 98)	Patients of < 5 year (*n* = 31)		Patients of > 5 year (*n* = 67)	*P*
Toxic look	91 (92.85)	28	(90.32)	63 (94.02)	<0.05
Coated tongue	65 (66.32)	19	(61.29)	46 (68.65)	<0.05
Pallor	39 (39.79)	16	(51.61)	26 (38.80)	<0.05
Hepatomegaly	36 (36.73)	09	(29.03)	27 (40.29)	<0.05
Splenomegaly	20 (20.40)	03	(9.67)	17 (25.37)	<0.05
Abdominal tenderness	0		0	0	NA
Rose spots	0		0	0	NA

Table 5: Frequency of complications in patients (N=104).

Complications	Number of patients (*n* = 98)	Percentage
Hepatitis	2	2.04
Colitis	2	2.04
Encephalopathy	1	1.02
Septic shock	1	1.02
Thrombocytopenia	1	1.02
Total	8	8.16

anorexia (30.61%), and cough (13.26%). different complaints like body ache (4.08%), headache (3.06%), constipation (2.04%), irritability (1.02%), aphasia (1.02%), and convulsions (1.02%) were gift in little variety of patients. Fever was the presenting complaints in each the age teams. Gastroin-testinal (GI) symptoms like abdominal pain, vomiting, and eating disorder were additional usually determined in patients > five years archaic [Table 3]. The foremost common signs determined by the specialist in patients were cyanogenetic look (92.85%), coated tongue (66.32%), pallor (39.79%), abnormalcy (36.73%), and hypertrophy (20.40%). None of the patients showed abdominal tenderness or rose spots. Most of the clinical signs were additional common in patients > five years archaic, and this distinction is statistically important ($p <$ zero.005, significant). achromasia was additional usually determined in patients (51.61%) < five years archaic ($p <$ 0.05) [Table 4].

All the patients enclosed within the study were started with Rocephin. Of of these patients, solely eight (8.16%) patients showed clinical resistance to Rocephin and given quinolones. 2 (2%) patients needed azithromycin additionally to quinolones. 58 (59.1%) patients became afebrile in but three days from the beginning of the treatment and twenty eight (28.5%) patients afebrile at intervals 4–7 days. solely twelve (12.4%) patients showed fever for quite seven days from the beginning of the treatment. No age-related distinction was determined within the interval to become afebrile. The mean period of hospital keep was six.4 ± 0.86 days, and there was no mortality in our series. During this study, 83.67% patients showed but 7-day keep in hospital, and 11.22% patients needed hospitalization for nearly one weeks. Solely 5 (5.11%) patients needed hospitalization for quite one week's. Complications of typhoid were seen in eight.16% of patients. Inflammation, colitis, and infectious disease was seen in 2 every (2.04%). nervous disorder, septic shock, GI bleed, and infection-associated blood disorder were seen in one every (1.02%) [Table 5].

4. Discussion

In this study, a lot of patients of typhoid fever were within the people of 6–10 years. This can be in all probability attributable to the exposure to unhealthful foods from outside. This finding is comparable the studies done by Arora *et al*., [8] subunit *et al*., [9] and Comeau *et al*., [10] wherever the common age of pres-entation was seven.4, 7.6, and 7.5 years, severally. However, no age is exempted from infectious disease. The youngest patient incl- uded within the study was of one year. This was in all probability as a result of this child was being given prime milk in dilution with water. This supports food-borne transmission of S. typhi. During this study, male: feminine quantitative relation was 0.81:1. Within the studies done by subunit *et al*., [9] Comeau *et al*., [10] and Koul *et al*., [11] there was a male predominance. During this study, organism was isolated from blood in mere four.10% patients. The utilization of antibiotics beforehand and delay in presentation reduced the speed of isolation of organisms from blood culture. The culture is long and not availa-ble altogether the places of Bangladesh. So, Widal test is also thought to be a crucial diagnostic tool for designation typhoid fever in powerfully suspected cases in our country. Vital titre was found within the second week and onward within the health problem. Paleness was found in thirty-nine.79% patients during this study. This find-ing is comparable to the study done by leader and leader [12] (35%). within the study done by Patankar and crowned head, [13] paleness was found in half a mile of the patients. Low incidence in our study is also attributable to solely involving youngsters, whereas the study done by sharer and crowned head [13] conjointly concerned the feminine sub-jects in fruitful people World Health Organization showed high anemia prevalence. During this study, fever was the presenting grievance altogether the patients (100%). this can be comparable the studies done by Comeau *et al*., [10] leader and leader [12], Patankar and crowned head [13], and Sood and Taneja [14]. GI complaints were the second common presenting symptom during this study. Abdom-inal pain was gift in fifty seven.14% patients and innate reflex in five hundredth patients. This can be kind of like the study done by Comeau *et al*., [10] that discovered abdominal pain in 56.4% and innate reflex in 48.7% patients. Constipation was discovered in mere 2.04% patients in our study, whereas it absolutely was not gift in any of the patients in keeping with the study done by Patankar and crowned head [13]. Constipation was gift in 17 November patients within the study done by Sood and Taneja [14], concerning 12.8% patients within the study by Comeau *et al*., [10] and eleven.2% patients within the study done by Taneja *et al*. [15] during this study, ototoxic appearance (92%) and coated tongue (66.32%) were the foremost common clinical signs discovered. within the study by Sood and Taneja [14]. ototoxic look was seen in fifty two patients. Coated tongue was gift in eighty one.2% patients within the study done by Taneja *et al*. [15] and fifty.2% patients within the study done by Sood and Taneja. [14] Abnormal condition was found in thirty six.73% patients during this study. This can be kind of like the study done by Sood and Taneja [14], that discovered hepa-tomegaly in thirty second patients. Hypertrophy was found in mere twenty.40% patients during this study. This can be comparable the study done by Comeau *et al*. [10] (20.5%). Rose spots couldn't be appreciated in any of the patients during this study. This was comparable the studies done by Saxena and Sharma [16], wherever solely zero.5% patient showed rose spots. The study done by Comeau *et al*. [10] discovered rose spots in two.6% patients. Rose spots weren't discovered in most of the Bangladeshn stud-ies, probably, due to the dark color of the skin of Bangladeshn population. During this study, complications were seen in mere eight.1% patients. Grave complications as well as myocardi-tis and GI hemorrhage weren't seen during this study. Among the rarer complications of typhoid fever, we have a tendency to encountered 2 cases of liver disease. a quick report of enteric liver disease has been documented earlier [17]. infectious disease nervous disorder, another fascinating complication seen in one in all our patients is being rumored

as a rising trend. Studies by Patankar and crowned head [13] (18.8%) and Comeau *et al*. [10] (38.5%) discovered a lot of compli-cations when put next with our study.

5. Conclusion

Typhoid fever continues to be important} pathological state leading to significant variety of youngsters requiring hospitalization. Public health interventions to reduce human car-rier contact, safe installation, improved personal healthful measures together with health-care behavior methods, enteric fever vaccination, and rational antibiotic choice supported sensitivity pattern to forestall resistance can facilitate to scale back the morbidity and mortality of this international pathological state.

Conflict of interest: The Author has no conflict of interest of the study.

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