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Original Articles

Clinico-laboratory Profile of Enteric Fever and Antibiotic Sensitivity Pattern in Hospitalized Children.

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Abstract:

Background: *Enteric fever is endemic in Bangladesh. This is an important cause of morbidity and mortality in developing countries. The aim of the study was to evaluate the clinical and laboratory profiles, culture positivity rate and sensitivity pattern of Salmonella enterica.*

Methodology: *This was an observational study carried out in a tertiary care hospital in Dhaka, Bangladesh during the period from January to December, 2017. Total 120 children who had enteric fever diagnosed either by positive blood culture or widal test with significant titre for Salmonella Typhi or Paratyphi were enrolled in the study.*

Results: *Fever and abdominal pain were the main presenting symptoms. Leucocyte and platelet count were normal whereas ALT and CRP found to be elevated. Culture positivity rate in our study was 43.33%. Of the culture positive isolates, 88.46% were Salmonella Typhi and 11.53% were Salmonella Paratyphi. All the isolates were sensitive to third and fourth generation cephalosporins while 79.54% showed intermediate sensitivity to ciprofloxacin.*

Conclusion: *A good sensitivity to third and fourth generation cephalosporins against Salmonella was noted whereas ciprofloxacin found to be less sensitive. Ceftriaxone showed remarkable efficacy when used as monotherapy.*

Key words: *Enteric fever, Culture positive, Widal test, Antibiotic sensitivity*

Introduction:

Enteric fever is a systemic disease caused by Salmonella enterica serovar Typhi or Paratyphi A or B.[1] It continues to be a major public health problem in the developing countries as water supply and sanitation are sub standard.[2] Each year more than 20 million new cases occur around the world while about 90% are from Asia. In India and Bangladesh the highest Incidence has been observed in age <5years.[3] The signs & symptoms of enteric fever resemble other febrile illnesses, so, clinical as well as laboratory diagnosis of enteric fever poses problem. For diagnosis of enteric fever blood culture is considered as “gold standard” as it identifies the organism and gives antibiotic sensitivity. But it is not possible to do blood culture in all cases due to lack of facility, increased cost and empirical use of antibiotic. Widal test is also used for diagnosis of enteric fever though it has suboptimal sensitivity and specificity and needs careful interpretation.[4] Since 1990s, Salmonella has developed resistance to all first line antibiotics (chloramphenicol, cotrimoxazole & ampicillin).[5] Fluroquinolones are widely used for treatment of enteric fever due to its cost effectiveness

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and good response but now clinical failure to ciprofloxacin has been observed.[6] Azithromycin is being used as an alternative agent in uncomplicated cases. It reduces the clinical failure rate and duration of hospital stay in comparison to ciprofloxacin. But experience with its use is still limited. [7] At present third generation cephalosporins are used widely for treatment of enteric fever but resistance to these antibiotics are also noted. [8]

Blood culture and sensitivity is an important tool for diagnosis as well as treatment. For effective treatment, choice of antibiotics sometimes causes problem as resistant pattern of Salmonella has been found to be different in different countries and regions of same country.[4] Hence an observational study was carried out in our hospital to evaluate the current scenario of enteric fever.

The primary aim of the study was to know the culture positivity rate and sensitivity pattern of Salmonella Typhi and Paratyphi and response to antimicrobial therapy. The secondary aim was to study the clinical and laboratory profiles of enteric fever in children.

Materials and method:

This was an observational study carried out in a tertiary care paediatric hospital situated in Mirpur, Dhaka, from January to December 2017. Patients of 1 to 14 years, clinically suspected as enteric fever and confirmed by positive blood culture by FAN (Fastidious Antibiotic Neutralization) method or widal test with significant titre (at least four fold rises or 1: 160 dilution of both H and O antibodies) by tube method were enrolled in the study.[9] Enteric fever with other co-morbidities were excluded from the study. Clinical, laboratory and treatment information were recorded and analyzed. Approval from hospital ethics committee was obtained.

Results:

Total 120 children of enteric fever were studied. Among them 63(52.5%) were male and 57(47.5%) were female. The mean age was 5.97 years. The lowest age was found to be 1 year 2 month. All patients had fever prior to admission; mean duration of fever before admission was 7 days, the range being 3 to 30 days. Abdominal pain, vomiting, diarrhoea and dry cough were the most common associated symptoms and found in 30%, 27.5%, 17.5% and 14.16% cases respectively. Hepatosplenomegaly was found in 7.5% patients while hepatomegaly in 30.83% and splenomegaly in 15% cases (Fig-1).

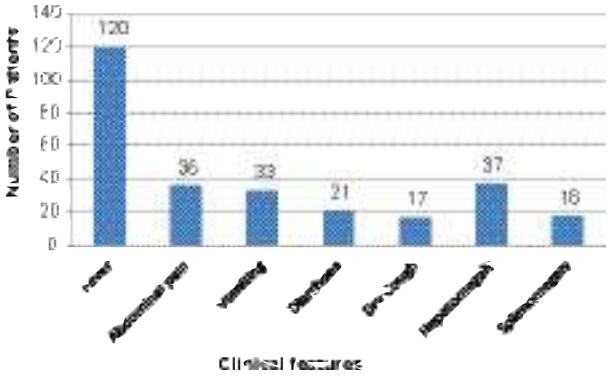

Fig.-1: *Clinical features of enteric fever in children*

The mean white blood cell (WBC) count of the study population was 7473 cells/cumm with a range from 1800 to 21,300/cumm. The mean platelet count was 2, 17,190/cumm (range 40, 000-4, 80,000). Table I shows the laboratory parameters of study population.

Table-I

Laboratory profiles of study population (n=120)

Laboratory parametres	No.	Percentage (%)
Normal WBC	91	76
Leucopenia	11	9.2
Leucocytosis	18	15
Absolute eosinopenia	35	29.2
Normal Platelet	110	91.6
Thrombocytoenia	4	3.3
Elevated ALT	28	23.3
Raised CRP	93	77.5

Out of 120 study population, 52(43.33%) were blood culture positive for Salmonella Typhi or Paratyphi and 68(56.66%) had significantly raised widal titre (at least four fold rises or 1: 160 dilution of both H and O antibodies). Among the culture positive isolates 44 (88.46%) were Salmonella Typhi and 8(11.53%) were Salmonella Paratyphi. Sensitivity pattern of Salmonella typhi is shown in Table II.

Table-II

Sensitivity pattern of Salmonella Typhi (total number N- 44)

Drug	Sensitive		Resistant		Inter-mediate	
	N	%	N	%	N	%
Ampicillin	34	77.27	10	22.72		
Amoxycillin	32	72.72	12	27.27		
Chloramphenicol	30	68.18	14	31.81		
Cotrimoxazole	32	72.72	12	27.27		
Cefepime	44	100	0	0		
Cefixime	44	100	0	0		
Ceftriaxone	44	100	0	0		
Ciprofloxacin	5	11.36	4	9.09	35	79.54
Levofloxacin	44	100	0	0		
Cephalexin	44	100	0	0		
Ceftazidim	44	100	0	0		
Azithromycin	18	40.90	5	11.36	21	47.72

There was no significant difference between the sensitivity pattern of S. Typhi and that of S. Paratyphi. For S. Paratyphi Intermediate sensitivity to ciprofloxacin was found in 75% cases and 100% sensitivity was seen in cases of ceftriaxone, cefepime, cefixime and levofloxacin.

Ceftriaxone was used to treat all patients diagnosed as enteric fever for at least 7 days and if patient was discharged before 14 days, then therapy was completed with cefixime. The mean duration of defervescence was 4.5 days in our study. During hospital stay, complications were seen in 14(11.5%) cases. Those were hypokalemia with paralytic ileus 7(5.8%), pneumonia 5(4.1%) and hepatitis 2(1.6%).

Discussion:

This study was an observational study on enteric fever in pediatric population. Fever was the commonest clinical presentation seen in all (100%) cases which was similar to studies done by other authors.[2, 4, 10] Next common clinical presentations were abdominal pain and vomiting which were 30% and 27.5% respectively in our study. Vomiting was the commonest presentation in Banu et al's[2] study (88%) and Ganesh et al's [10] study (49%). In 31% cases we found hepatomegaly which was consistent with Banu et al's[2] study (38%) but higher in Ganesh et al's [10] study (71%). We found splenomegaly in 15% cases which was consistent with Banu et al's[2] study (16%) but higher in Jeeyani et al's [4] study (33.8%).

Total white blood cell count was normal (4000-11000 cells/cumm) in majority of our patients (76%) which was similar to earlier studies.[10, 11] Absolute eosinopenia (<30cells/cumm) was seen in 29.2% of our patient which was lower than the study done by Jeeyani et al [4] (72.5%) and Ganesh et al [10] (78.4%). Absolute eosinopenia can indicate the diagnosis of enteric fever. Normal platelet count (1.5-4 lacs/cumm) was seen in 91.6% of our study population which was consistent with other studies.[11, 12] Thrombocytopenia (platelet count <1.5 lacs/cumm) was seen only in 3.3% of our study children. Alanine Amino Transferase (ALT) was found to be elevated (>60 IU/L) in 23.3% of our study patient which was consistent with Jeeyani et al's [4] study (25.7%).

In our study blood culture for Salmonella was positive in 43.33% cases whereas it was 49.35% in other study.[4] All the isolates were sensitive to third & fourth generation cephalosporins and levofloxacin, but ciprofloxacin showed only 11.36% sensitivity. Other study showed 20-50% sensitivity to ciprofloxacin[3, 4]. First line antibiotics also showed good sensitivity (Ampicillin- 77.27% and Amoxycillin-72.72%). Azithromycin was only 41% sensitive in this study.

All patients responded to single therapy with ceftriaxone. The mean time of defervescence was

4.5 days in our study; which was 4.2,6 and 6.1 days in Jog et al's [11], Chowta et al' [12] and parry et al's [5] study respectively.

Conclusion:

Fever and abdominal pain were the commonest presenting symptoms of enteric fever. Normal leucocyte and platelet count, elevated ALT and CRP can support the diagnosis. Reduced resistance to ampicilin & amoxicillin and good sensitivity to third and fourth generation cephalosporin and levofloxacin were found. Also ceftriaxone was found to be effective when used as monotherapy. Though ciprofloxacin showed reduced sensitivity levofloxacin can be used as an alternative oral therapy.

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