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"Clinical Profile of Paediatric Patients of Enteric Fever: A study in a tertiary care hospital, Dhaka, Bangladesh"

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Abstract **Original Research Article**

Introduction: Enteric fever is a systemic infectious disease which largely affects children. Enteric fever is characterized by fever and abdominal pain caused by dissemination of Salmonella typhi or Salmonella paratyphi type A, B, or C. The term 'enteric fever' is a collective term that refers to severe typhoid and paratyphoid. Typhoid fever, also known simply as typhoid, is a bacterial infection due to Salmonella typhi that causes symptoms which may vary from mild to severe and usually begin six to thirty days after exposure. ***Aim of the study:*** The aim of the present study was to evaluate the clinical profile of paediatric patients with enteric fever. ***Method:*** This was prospective observational study which was conducted of Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh during the period from January 2018 to December 2018. In total 177 paediatric patients with enteric fever with complete documents were selected as the study people. Proper approval from the ethical committee of the hospital and the proper written consents of all the participants were obtained before starting the intervention. ***Results:*** The highest number of patients was found from 7 to 12 years' age group which was 47%. Then 33% were from 13-18 years' age group and only 20% were from <6 years' age group. Among the symptoms, abdominal pain was found among the highest number of patients and it was 63.84%. In antibiotic resistance test of this study we found ceftriaxone showed the best susceptibility in treating enteric fever in paediatric patients among seven selective antibiotics. ***Conclusion:*** Most of the paediatric patients with enteric fever were from 7-12 years age range. Abdominal pain and fever had been found as the most frequent symptoms of this disease. On the other hand ceftriaxone was fond as the most effective against enteric fever. All these finding may be helpful in treating the paediatric patients with enteric fever.

Keywords: Enteric fever, Typhoid fever, Resistance, S. typhi, Clinical profile.

INTRODUCTION

It is estimated that globally there are 27 million cases of enteric fever occurring each year which estimates mortality varying from 216,000 to 600,000 per annum[1]. The majority of cases of enteric fever are reported in south Asia. It is considered as significant burden in India [2].The term 'enteric fever' is a collective term that refers to severe typhoid and paratyphoid. Typhoid fever, also known simply as typhoid, is a bacterial infection due to Salmonella typhi that causes symptoms [3] which may vary from mild to severe and usually begin six to thirty days after exposure. It often found there is a gradual onset of a high fever over several days. In enteric fever, weakness, abdominal pain, constipation, and headaches also commonly occur [4]. Diarrhea is uncommon and vomiting is not usually severe [4]. Some people develop a skin rash with rose colored spots. In severe cases there may be confusion [4]. Without treatment symptoms may last weeks or months. Other people may carry the bacterium without being affected that is still able to spread the disease to others. Typhoid fever is a type of enteric fever along with paratyphoid fever [3]. The cause is the bacterium Salmonella typhi, also known as Salmonella enterica serotype Typhi, growing in the intestines and blood [4]. Typhoid is spread by eating or drinking food or water contaminated with the feces of an infected person. Risk factors include poor sanitation and poor hygiene [3]. Those who travel to the developing world are also at risk [4] and only humans can be infected. Diagnosis is by either culturing the bacteria or detecting the bacterium's DNA in the blood, stool, or bone marrow [5]. Culturing the bacterium can be difficult to perform. Bone marrow testing is the most accurate [5]. Enteric fever commonly presents with

nonspecific clinical features such as fever, flu-like symptoms with chills, a dull frontal headache, malaise, anorexia, poorly localized abdominal discomfort, a dry cough and myalgia, nausea, vomiting, constipation, and diarrhea [6]. A typhoid vaccine can prevent about 30% to 70% of cases during the first two years [7]. The vaccine may have some effect for up to seven years [3]. It is recommended for those at high risk or people traveling to areas where the disease is common [4]. Other efforts to prevent the disease include providing clean drinking water, better sanitation, and better hand washing [4]. Treatment of disease is with antibiotics such as azithromycin, fluoroquinolones or third generation cephalosporins[3]. Resistance to these antibiotics has been developing, which has made treatment of the disease more difficult [3]. In 2015 there were 12.5 million new cases worldwide [8]. The disease is most common in India[3]. Children are most commonly affected [3]. Rates of disease decreased in the developed world in the 1940s as a result of improved sanitation and use of antibiotics to treat the disease [6]. In 2015 it resulted in about 149,000 deaths worldwide – down from 181,000 in 1990 (about 0.3% of the global total) [9]. It was found in literature review that, the name typhoid means "resembling typhus" due to the similarity in symptoms. Diagnosis is made by any blood, bone marrow or stool cultures and with the Widal test (demonstration of antibodies against Salmonella antigens O-somatic and H-flagellar). The aim of the present study was to evaluate the clinical profile of paediatric patients with enteric fever. All the steps were performed to fulfill the aim of this study.

OBJECTIVES

a) General objective

- To evaluation of clinical features of paediatric patients with enteric fever in Bangladesh.

b) Specific objectives

- To observe the scenario of enteric fever in children in Bangladesh

MATERIALS & METHODS

This was prospective observational study which was conducted in the Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh during the period from January 2018 to December 2018. In total 177 paediatric patients with enteric fever with complete documents were selected as the study people. The age range of the participants was 6 months to 18 years. Proper approval from the ethical committee of the hospital and the proper written consents of all the participants were obtained before starting the intervention. The mode of presentation, clinical course, treatment history, laboratory investigations reports, antibiotic administered response to therapy and the complications were recorded. Following is the inclusion and exclusion criteria for the both study group.

Inclusion criteria

- Positive blood culture for Salmonella typhi or Salmonella paratyphi organisms.
- Significant Widal titre
- A repeat fourfold rise in Widal test titer

Exclusion criteria

- A Patients with respiratory tract infection (tuberculosis, pneumonia)
- Patients with urinary tract infections
- Patients with malaria
- Immunocompromised patients (AIDS)
- Patients who had already vaccinated with typhoid vaccine.

A pre-designed questioner had been used to collect all the necessary data from the participants. Program MS-Excel was used in collecting data, SPSS version 20 was used in analyzing data. On the other hand several tables were used to disseminate data.

RESULTS

Among 177 participants 52% was male which 92 in number. On the other hand, 48% was female which 87 in number. The male female ratio was 1.06:1. So, male was dominating in gender distribution. The highest number of patients was found from 7 to 12 years' age group which was 47%. Then 33% were from 13-18 years' age group and only 20% were from <6 years' age group. Among the symptoms, abdominal pain was found among the highest number of patients and it was 63.84%. Then fever was fond in 83.05%, vomiting was found in 41.24%, headache was found in 36.72%, diarrhea was found in 32.20%, chills was found in 30.51%, myalgia was found in 16.38%, anorexia was found in 12.99%, constipation was found in 10.17% and cough was found in 8.47%. A chart of Widal test titer results has been added herewith. In antibiotic resistance test of this study we found ceftriaxone showed the best susceptibility in treating enteric fever in paediatric patients among seven selective antibiotics. The highest resistance case had been found with nalidixic acid which was 70.62% followed by 67.80% with amoxycillin, 64.97% with chloramphenicol, 57.06% with ampicillin, 54.24% with cotrimoxazole, 22.60% with ciprofloxacin and only 1.69% with ceftriaxone.

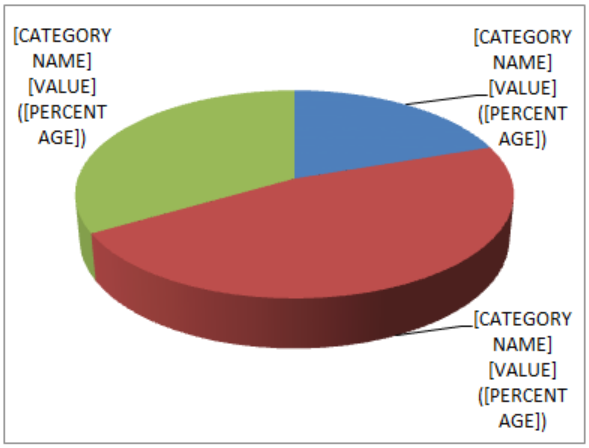

Fig-I: Age distribution of participants (n=177)

Table-I: Symptoms distribution among participants (n=177)

Symptoms	n	%
Abdominal pain	113	63.84
Fever	147	83.05
Vomiting	73	41.24
Headache	65	36.72
Diarrhoea	57	32.20
Chills	54	30.51
Myalgia	29	16.38
Anorexia	23	12.99
Constipation	18	10.17
Cough	15	8.47

Table-II: Results of Widal test titer (n=177)

	Widal test titer	n	%
TO	Normal	31	17.51
	2 fold	24	13.56
	4 fold (>1:160)	90	50.85
	8 fold (>1:320)	32	18.08
TH	Normal	15	8.47
	2 fold	23	12.99
	4 fold (>1:160)	87	49.15
	8 fold (>1:320)	52	29.38
AH	Normal	55	31.07
	2 fold	78	44.07
	4 fold (>1:160)	11	6.21
	8 fold (>1:320)	33	18.64

Table-III: Antibiotic resistance among the participants (n=177)

Antibiotic	Sensitivity		Resistance	
	n	%	n	%
Ceftriaxone	174	98.31	3	1.69
Ciprofloxacin	137	77.40	40	22.60
Cotrimoxazole	81	45.76	96	54.24
Ampicillin	76	42.94	101	57.06
Chloramphenicol	62	35.03	115	64.97
Amoxycillin	57	32.20	120	67.80
Nalidixic acid	52	29.38	125	70.62

DISCUSSION

In the treatment procedure of enteric fever Widal test is a trusted diagnosis process. In epidemics and less wealthy countries, after excluding malaria, dysentery, or pneumonia, a therapeutic trial time with chloramphenicol is generally undertaken while awaiting the results of the Widal test and cultures of the blood and stool[10]. The Widal test is time-consuming, and prone to significant false positive results. The test may be also falsely negative in the early course of illness. The typhidot test becomes positive within 2–3 days of infection and separately identifies IgM and IgG antibodies. The test is based on the presence of specific IgM and IgG antibodies to a specific 50Kd OMP antigen, which is impregnated on nitrocellulose strips. IgM shows recent infection whereas IgG signifies remote infection. The most important limitation of this test is that it is not quantitative and result is only positive or negative. Enteric fever is not a notifiable disease throughout India and hence the correct incidence is not known. Limited studies in the country reveal more than 3 lakh cases and more than 650 deaths (approx.) annually [11]. It is a potentially fatal multisystemic illness caused primarily by Salmonella Enterica, subspecies entericaserovars Typhi and, to a lesser extent, related serovarsparatyphi A, B, and C. This study is planned with the aim to assess the clinical profile in enteric fever. Maximum resistance for chloramphenicol, amoxicillin, and ampicillin were seen as compared to ceftriaxone and ciprofloxacin. Also Maximum sensitivity is seen with Ceftriaxone. For the prevention of disease in developing countries like India public education measures should be to encouraged regarding the need for thorough hand washing before eating and preparing/handling foods and sanitary disposal. In the diagnosis of typhoid fever though none of the clinical symptoms and sign have very high accuracy, diagnostic criteria's may be helpful when combined with high index of suspicion and relevant laboratory investigations. Widal test is very commonly used in Indian set up but has variable sensitivity and specificity andtherefore has problems in interpretation. As a gold standard blood culture should be done for the definitive diagnosis and proper treatment pertaining to the antibiotic sensitivity and resistance of the isolate. The aim of the present study was to evaluate the clinical profile of paediatric patients with enteric fever. In our study among total 177 participants 52% was male which 92 in number. On the other hand, 48% was female which 87 in number. The male female ratio was 1.06:1. The highest number of patients was found from 7 to 12 years' age group which was 47%. Among the symptoms, abdominal pain was found among the highest number of patients and it was 63.84%. A chart of Widal test titer results has been added herewith. In antibiotic resistance test of this study we found ceftriaxone showed the best susceptibility in treating enteric fever in paediatric patients among seven selective antibiotics. The highest resistance case had been found with nalidixic acid which was 70.62%

followed by 67.80% with amoxycillin, 64.97% with chloramphenicol, 57.06% with ampicillin, 54.24% with cotrimoxazole, 22.60% with ciprofloxacin and only 1.69% with ceftriaxone.

LMITATION OF THE STUDY

This was a single centered observatory study with a small sample size. So the findings of this study may not reflect the exact scenarios of whole country.

CONCLUSION AND RECOMMENDATIONS

In our study most of the paediatric patients with enteric fever were from 7-12 years age range. Abdominal pain and fever had been found as the most frequent symptoms of this disease. On the other hand ceftriaxone was fond as the most effective against enteric fever. All these finding may be helpful in treating the paediatric patients with enteric fever. But as there were some unavoidable limitations in our study, for getting more specific information we would like to recommend for conducting more studies regarding the same issue in several places.

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