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FACTORS ASSOCIATED WITH TYPHOID FEVER IN PEDIATRIC CASES AT TERTIARY CARE HOSPITAL

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ABSTRACT

The study was planned to identify the risk factors associated with typhoid fever. Among 104 suspected cases, 42 cases were confirmed by typhi dot. Of which 42.9% cases were of < 5 years. The Salmonella typhi positivity was higher in those who had fever from 5-15 days. From these findings, we suggest that improving the quality of water through public education campaigns and stressing the importance of boiling water before drinking appears to be the most realistic approach to prevention.

KEYWORDS: Typhi Dot, Salmonella Typhi, Typhoid Fever

INTRODUCTION

Diagnosis of typhoid fever among many cause of fever is a high challenge. The infection is normally acquired by ingestion of Salmonella typhi in contaminated food or water [Levine 2003]. In developing countries where there is no adequate water supply quantitatively and qualitatively, typhoid fever remains common [Merican 1997 & Parry et al 2002]. Although, cases of typhoid fever are infrequent in developed countries. According to WHO, approximately 17 million cases and more than 600,000 deaths occur annually due to typhoid fever [Harish et al 2011]. The gold standard method for diagnosis of typhoid fever is blood culture [Ambati et al 2007]. However, blood culture requires a well-equipped laboratory, skilled staff, and may take up to 7 days [Ley et al 2011]. In developing countries, due to limited laboratory facilities the diagnosis of typhoid fever remains a challenge. Specific clinical signs [Hosoglu et al 2006, Vollaard 2005 et al, Mtove G et al 2010 ] or cheap and accurate point care test have remain elusive [Ley et al 2011, Ley et al 2010, Keddy et al 2011) and clinical algorithms are controversial because of their limited generalizability [Bhutta 1996]. Therefore, a simple and rapid non-culture assay for the diagnosis of
Typhoid fever would be of great benefit in circumstances where more sophisticated laboratory support is not feasible. Recently, such a test has become commercially available under the proprietary name Typhidot. It is a dot-Enzyme Immunoassay (EIA), a new serologic test based upon the presence of specific IgM antibodies to a specific 50 kDa outer membrane protein (OMP) antigen on Salmonella typhi. The test become positive as early as in the first week of the fever, the results can interpreted visually and available within one hour. So, in this study, the newly developed rapid Typhidot assay was applied for the detection of S. typhi-specific IgM antibodies in serum.

Contaminated food and drinking water are the most common means of transmission [Lin et al 2000]. In endemic areas, the incidence of typhoid fever peaks in youngest age group of 1-19 years [Lin et al 2000, Sinha et al 1999]. In this study, we determined potential clinical signs and laboratory findings associated with typhoid fever.

MATERIALS AND METHODS

The study was carried out in a North Indian tertiary care hospital from 2010-2011, and the study was approved by the Ethical Committee of the Institute. Attention was focused on age, sex, hygiene habits, differential diagnosis, and clinical features. Those patients provided signed consent a standard physical examination was recorded. Diagnosis of typhoid fever was made on the basis of Typhidot.

Techniques

Clinical data was collected through semi-structured interviews. Suspected case were interviewed using a standardized questionnaire and variables describing demographic and socioeconomic condition the environment, Child’s food and hygiene habits were collected. Enrolled patients gave a inform consent. This face to face interview was conducted in local language. Results are presented in percentages and chi-square test is used to compare the dichotomous/categorical variables. The p-value less than 0.05 were considered as significant. The analysis was carried out by using SPSS 16.0 version.

RESULTS

A total of 104 suspected cases were enrolled in the study. All the cases were diagnosed by Typhi dot, had clinical symptoms compatible with typhoid fever at the time of sampling.
Clinical Manifestation

The clinical manifestations of typhoid fever in this study group are shown in Table 1. Typhoid fever was accurately diagnosed on presentation in only 42 cases. S. typhi positivity was higher in those who had fever from 5-15 days (52.4%) as compared to 15-30 days (42.9%) and >30 days (4.8%). Headache was reported in 58.4% cases, loss of appetite in 66.7%, dullness in 66.7%, and loose motion in 42.9% and nausea in 4.8% of the cases.

The demographic characteristics and hygienic practices with S. typhi +ve to S. typhi –ve are listed in Table-2. The S. typhi positivity was higher in children below 5 years (42.9%) as compared to 5-10 years (38.1%) and 11-15 years (19%). The S. typhi positivity was higher in males as compared to females (47.6%). The S. typhi positivity was higher in those children who were living in joint family (57.1%) as compared to those who were living in nuclear type of family (42.9%). The positivity was also higher in birth order of one (52.4%).

DISCUSSION

Typhoid fever is transmitted by ingestion of food or water contaminated by faeces or urine of patients or carriers. Important vehicles include shellfish, raw fruits and vegetables fertilised by human excrement and eaten raw, contaminated milk/milk products, and undiagnosed cases. Flies may also act as mechanical carrier and infect food in which the bacteria multiply to infective dose. An oral dose of at least 10 S. typhi cells are needed to cause typhoid in around 50% of human volunteers [Guzman et al 2006]. It penetrates the intestinal mucosa and multiplies in the mesenteric lymph nodes, from which viable bacteria may enter the bloodstream. The incubation period ranges from 7 to 21 days. Typhoid fever is a particularly difficult problem in parts of the world with less-than-adequate sanitation practices. In the United States, many patients who become afflicted with typhoid fever have recently returned from travel to another country, where typhoid is much more prevalent, such as Mexico, Peru, Chile, India, and Pakistan.

In previous studies, the attack rate of typhoid fever was reported to be amongst children aged 1-9 years (Lin et al 2000, Sinha et al 1999). Low detection rates of typhoid fever for children aged less than 5 years can be attributed to milder or atypical presentation at this age, in addition to difficulties in collecting blood sample [Sinha et
In our study, we found that S. typhi positivity was higher in children below 5 years (42.9%) as compared to 5-10 years (38.1%) and 11-15 years (19%).

We also found that the personal hygiene of cases was less good for example; cases never or rarely washed their hands before eating and used less clean water. Inadequate hygienic habits were associated with carriers of bacterial enteric pathogens in families with children who had typhoid fever [Alvarez et al 1992]. These facts should be interpreted carefully as the study was not population based.

Typhoid fever was found to be non-specific in terms of clinical signs and symptoms compare to other febrile episodes and similar to [Mtovic et al 2010] we observed that patients with acute episode of typhoid fever would attend hospital significantly later than patients with other bacterial infections and patients where no bacteria were isolated from blood stream. Duration of fever was therefore the only significant predictor for typhoid fever. In our study, the S. typhi positivity was higher in those who had fever from 5-15 days (52.4%) as compared to 15-30 days (42.9%) and >30 days (4.8%). Most of the patients included in the study were living in poor hygiene conditions. They did not have access to safe/potable drinking water.

Untreated water was found to be risk factor for typhoid fever, as frequently reported in previous studies [Anonymous 1998, Bahl 1976, Mermin et al 1999, Swaddiwudhipong et al 2001). In a study, general community was well aware regarding relationship of typhoid fever with the hygienic practices [Alam et al 2008].

Therefore, from these findings we can suggest that improving the quality of drinking water through public education campaigns and stressing the importance of boiling water before drinking appears to be the most realistic approach to prevention. In order to reach uneducated people, the information must be provided orally and/or through pictures and cartoons.

REFERENCES


**Table-1: Comparison of clinical features with S. typhi positive to S. typhi negative**

<table>
<thead>
<tr>
<th>Factors</th>
<th>S. typhi +ve (n=42)</th>
<th>S. typhi –ve (n=62)</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Duration of fever</td>
<td></td>
<td></td>
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<tr>
<td>5 to 15</td>
<td>22</td>
<td>40</td>
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<tr>
<td>15-30</td>
<td>18</td>
<td>18</td>
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<tr>
<td>&gt;30</td>
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<tr>
<td>Headache</td>
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</tr>
<tr>
<td>Loss of appetite</td>
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<td>26</td>
<td>0.07</td>
</tr>
<tr>
<td>Dullness</td>
<td>28</td>
<td>42</td>
<td>0.93</td>
</tr>
<tr>
<td>Loose motion</td>
<td>19</td>
<td>14</td>
<td>0.12</td>
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<td>Nausea</td>
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<td>0.77</td>
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Table-2: Comparison of demographic and hygienic practices with S. typhi +ve to S. typhi –ve

<table>
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<th>S.typhi –ve (n=62)</th>
<th>p-value</th>
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<tr>
<td></td>
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<td>%</td>
<td>No.</td>
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<td>&lt;5</td>
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<td>Hand washing before meals</td>
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<tr>
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