

Clinical Profile of Dengue Fever in Children

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Abstract

Background: Dengue infection has become endemic in Bangladesh since it has been broken out in June 2000. Although children are the usual victim of dengue infection, there is paucity of published data regarding dengue infection in children in our country.

Objectives: This study was designed to document the presenting features and outcome of Dengue infection in children.

Materials and Methods: This cross sectional study was done among the children having Dengue infection. Fifty four consecutive patients were enrolled. Purposive sampling was done. In every patient a detailed history was taken. Clinical examinations and relevant investigations were done. Data were collected in a predesigned structured questionnaire. Data were analyzed with the help of descriptive statistics and Chi-square (χ^2) Test.

Results: The mean age of the patients was 6.5 ± 3.5 years with equal male and female ratio. Among 54 patients, 40.7% presented with dengue fever (DF), the rest (59.3%) presented with dengue haemorrhagic fever (DHF). Most of the patients presented with high grade continued type of fever (75.9%), followed by abdominal pain (59.3%), vomiting (57.4%). Itchy rash and fever were the most important characteristic signs (75.9% each). Flushed appearance observed in 68.4% and 59.3% patients showed bleeding manifestation of which sub-conjunctival haemorrhage was the commonest form (33.3%). Leucopenia were present in only 9.3% of the patients. Platelet count less than $100 \times 10^9/L$ were found in 68.5% patients. Tourniquet test was positive in 31.5% of cases. All of the patients had packed cell volume (PCV) less than 45%. Raised serum alanine aminotransferase (ALT) was observed in 40.7% of children. IgM and/or IgG antibodies for dengue virus were positive in 96.29% patients. Majority (94%) of the patients completely recovered from the disease and only 6% died.

Conclusion: High grade continued fever, vomiting with abdominal pain and itchy skin rash (with normal platelet count) were the presenting features. Commonest form of bleeding manifestation was subconjunctival haemorrhage. Bleeding manifestation had a significant association with the degree of thrombocytopenia but no correlation was observed with tourniquet test positivity.

Key words: Dengue fever (DF), dengue haemorrhagic fever (DHF), paediatric.

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Introduction

Dengue is a serious mosquito-borne viral disease which in recent years has become a major international public health concern. It is the most serious viral haemorrhagic fever in the world with an annual incidence of 100 million cases per year¹. Of them 250,000 to 500,000 cases are reported as dengue haemorrhagic fever (DHF) (because of the presence of haemorrhagic manifestations, thrombocytopenia and signs of plasma leakage) with an estimated death of about 12,000. The dengue virus is a RNA virus and consists of 4 serotypes (DEN 1 - 4). In Bangladesh

the magnitude of dengue fever was largely unknown until it took a heavy toll in 2000 (5555 cases and 93 deaths were reported². Nearly 90% of the dengue infections occur in children with risk of dying during a secondary attack is nearly 15-fold higher than that of adults³. Although children are the main group affected by dengue, little published data are available regarding dengue infections in children living in South Asia. In the context of Bangladesh, data of dengue infection in children are even scarce. The present study was carried out in order to document the clinical manifestations of dengue infections in children in Bangladesh.

Materials and Methods

The present study was conducted in the Central Hospital Ltd, Green Road, Dhaka (a tertiary care private hospital) between June 1 to September of 2006, 2007 and 2008 on children of dengue fever up to 15 years of age. After obtaining informed consent from the parents a total of 54 children were selected consecutively based on clinical features mentioned in National Guidelines for Clinical Management of Dengue Syndrome, Bangladesh 2000⁷. Patient with any identified specific infection or febrile illness more than two weeks were excluded from the study. Demographic variables, presenting complaints and examination findings were recorded on a structured questionnaire. Tourniquet test was done in predicting feature of bleeding manifestations. White blood cell count (WBC count), platelet count, PCV, ALT, IgM and IgG antibodies for dengue virus were investigated as supporting evidence for dengue infection. Chest X-ray and ultrasonography of whole abdomen were done in selected patients where clinical findings were suggestive. The WHO classification and case definitions were used to classify disease as DF and DHF³. DHF was further divided into four grades (I, II, III, IV) as per National Guidelines⁷. The test statistics used to analyze the data were descriptive statistics, chi-square (χ^2) test.

Results

Out of 54 patients 27 were male and 27 were female with male to female ratio was 1:1. Age ranged from 6 months to 15 years with a mean of 6.5± 3.5 years, About half (51.9%) of them were between 5-10 years old (Table-I). Sixty three percent of children complained of fever >5 days with continued type of fever being predominant (75.9%). About 60% of patients had abdominal pain, 57% vomiting, 46.3% myalgia, 31.5% headache, 18.5% arthralgia, 14.8% retro-orbital pain, 9.3% loose stool and 3.7% runny nose/cough. Among the signs, rash with itching was a salient feature (75.9%) followed by flushed appearance (64.8%), subconjunctival haemorrhage (33.3%), hepatomegaly

(31.5%), pleural effusion (27.8%), malaena (14.8%), ascitis (14.8%) and gum bleeding (13.3%) (Table-II).

Table-I
Demographic variables (n=54)

Age (years)	No. (%)
<5	16(29.6)
5-10	8(51.9)
>10	10(10.5)
Sex	
Male	27 (50)
Female	27 (50)

Table-II
Clinical variables

Clinical features	No. (%)
Duration of fever (days) (mean 4.9 ± 1.5 days)	
<5	20 (37)
>5	34(63)
Type of fever	
Continued	41 (75.9)
Intermittent	11 (20.4)
Remittent	01 (1.9)
Biphasic	01 (1.9)
Body pain	
Myalgia	25 (46.3)
Arthralgia	10(18.5)
Headache	17(31.5)
Retro-orbital pain	08(14.8)
Runny nose/cough	02 (3.7)
Loose stool	05 (9.3)
Vomiting	31 (57.4)
Abdominal pain	32 (59.3)
Signs/symptoms	
Rash with itching	41 (75.9)
Flushed appearance	35 (64.8)
Signs of shock	06(11.1)
Haemorrhage	32 (59.3)
Gum bleeding	07(13)
Subconjunctival haemorrhage	18(33.3)
Petechiae	04 (7.4)
Haematemesis	07(13)
Melaena	08(14.8)
Pleural effusion	15(27.8)
Hepatomegaly	17(31.5)
Splenomegaly	02 (3.7)
Ascites	08 (14.8)

Table-III*Distribution of patients by investigations (n=54)*

Investigations	No. (%)
Tourniquet test	
Positive	17 (31.5)
Negative	37 (68.5)
Low WBC ($\leq 4 \times 10^9/l$)	05 (9.3)
Platelet count	
$\geq 100 \times 10^9/L$	17 (31.5)
51-100 $\times 10^9/L$	18 (33.3)
21-50 $\times 10^9/L$	14 (25.9)
$\leq 20 \times 10^9/L$	05 (9.3)
PCV <45%	54 (100)
Raised ALT	22 (40.7)

About one-third (32%) of the patients had positive tourniquet test. Five (9.3%) had low WBC count. One-third (33%) of patients had platelet count, 51- 100 $\times 10^9/L$ 25.9% with 21-50 $\times 10^9/L$ and 9.3% with $<20 \times 10^9/L$ and 31.5% patient had platelet count $\geq 100 \times 10^9/L$. All children exhibited a packed cell volume (PCV) of less than 45% and over 40% had raised serum alanine aminotransferase (ALT) (Table-III). IgM and IgG antibodies for dengue virus were positive in 40.7% and 24.1% of patients respectively, both IgG and IgM were positive 31.5% cases and serological tests were negative in 3.7% cases.

Over 40% of the patients presented with dengue fever, 27.8% had DHF grade-I, 16.7% DHF grade-II, 3.7% grade-III and 11.1% grade-IV. Majority (94%) of the patients completely recovered from the disease and only 6% died of the disease.

Discussion

This cross sectional study was done to document the clinical findings in dengue infection in Bangladeshi children. It seems to be one of the preliminary efforts of this kind in Bangladesh. The mean age of the patients was 6.5 ± 3.5 years with age range of 6 months to 15 years. Male female ratio was 1:1. Similar results were reported by Malavige et al⁸ and Ahmed et al⁹, Malavige GN et al⁸ found mean age of the patients 7.9 ± 2.9 years and their age range was from 1 month to 12 years⁹ while Ahmed et al. found mean age 9.0 ± 2.8 years with a age range of 2.5-12 years⁹. A male preponderance with a male female ratio of 3:2 was observed by Ahmed et al⁹.

Majority (75.9%) of the patients had continued type of fever. Abdominal pain was the cardinal complaint in 60% of the patients followed by vomiting (57%), myalgia (46.3%), headache (31.5%), arthralgia (18.5%), retro-orbital pain (14.8%), loose stool (9.3%) and runny nose/cough (3.7%). These findings were completely different from that of Rahman et al¹⁰. Rahman et al had reported headache as the most predominant symptom (91%) followed by myalgia/arthralgia (85%) and vomiting (64%). Malavige et al had reported runny nose in 20% of patients. Ahmed FU et al found headache in 85%, myalgia in 73%, retro-orbital pain in 27% & vomiting in 15% of children⁹. Diaz et al had reported abdominal pain precede the onset of plasma leakage in approximately 6% of adults and children with DHF¹¹.

In the present study rash with itching was a predominant feature (75.9%) followed by flushed appearance (64.8%), Subconjunctival haemorrhage (33.3%), hepatomegaly (31.5%), pleural effusion (27.8%), melaena (14.8%), ascitis (14.8%) and gum bleeding (13.3%). Malavige et al had reported about 40% of patients with rash and 90% with flushed appearance. Sharply contrasting with these findings, Ahmed FU et al found skin rash in only 12% of children. They also found bleeding manifestations as gum bleeding (16%), haematemesis (19%), epistaxis (12%), melaena (8%), subconjunctival haemorrhage (4%). Rahman et al described spontaneous bleeding in 25% of patients with DF¹⁰.

A haemorrhagic tendency could be elicited by tourniquet test. In the present study, about 32% of the patients had positive tourniquet test. WBC count was low in 9.3% cases. All of the patients had packed cell volume (PCV) <45% and raised alanine aminotransferase (ALT) in over 40% of the cases. Platelet count $<100 \times 10^9/L$ were found in 68.5% children. Of them two-third (67.6%) had bleeding manifestation. Bleeding manifestation was invariably present in children with platelet count $<20 \times 10^9/L$, in 78.6% of children with platelet count 20-50 $\times 10^9/L$, in 50% with count 51-100 $\times 10^9/L$ and 41.2% with count $>100 \times 10^9/L$. Bleeding manifestation had a significant association with the degree of thrombocytopenia ($p=3.036$). However, Malavige GN et al failed to find out any relationship between bleeding manifestation and degree of thrombocytopenia ($p>0.05$)⁸.

Malavige et al observed platelet levels of $<100 \times 10^9/L$ in 70.2% children, of them $51-100 \times 10^9/L$ in 24.2%, $20-50 \times 10^9/L$ in 46.7% and $<20 \times 10^9/L$ in 30% children. The tourniquet test was positive in 47.5% and raised ALT in 49% of children⁸. Ray et al demonstrated alanine aminotransferase (ALT) was abnormal in 50% of patients¹². Ahmed et al described 38% of the children with positive tourniquet test and 19% with low WBC⁸.

IgM and IgG antibodies for dengue virus were positive in 40.7% and 24% of patients respectively and both of them were positive in 31% cases. due to lack of relevant literature these findings could not be correlated.

In our study most of the patients (40.7%) presented with dengue fever (DF), 27.8% with dengue haemorrhagic fever (DHF) grade-I, 16.7% DHF grade-II, 3.7% grade-III and 11.1% grade-IV. Malavige GN et al showed 17.3% children with DHF. Of the DHF 39.5% of patients had grade-I, 26.7% grade-II, 31.4% grade-III and 2.3% grade IV⁸.

Majority (94%) of the patients recovered from the disease and only 6% patients died. Rahim and Azad MAK in a review had reported that out come of DF was excellent but mortality rate in DHF was 5-10%¹³. Tassniyom et al had reported case fatality rate of 12% in DHF even with aggressive therapy¹⁴.

Conclusion

Most of the children with dengue fever presented with high grade continued fever with vomiting and abdominal pain. Flushed appearance with itchy skin rash and subconjunctival haemorrhage were striking features. Leokopenia was very rare finding. More than half of the patients showed bleeding manifestation even with negative tourniquet test.

Recommendation

Rash with itching was observed as distinctive feature of dengue infection in children which must be validated with a large scale study before being included in the National Guidelines for Clinical Management of Dengue Syndrome. Studies on patterns of paediatric dengue infection in different regions would help clinicians and health administrators to make more informed and evidence-based health planning decisions.

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