

Clinical profile of dengue infection in a tertiary care hospital

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Abstract

Background: Dengue is a major international health concern that is prevalent in tropical and sub-tropical countries. The total burden of febrile illnesses that presents to primary health facilities due to dengue in different parts of Karnataka is largely unknown. **Objective:** The objective was to study the different clinical manifestations, trend, and outcome of dengue cases admitted in a tertiary care hospital. **Materials and Methods:** Prospective study conducted over a period of 6 months (July-December 2013) in a tertiary care hospital at Bangalore. Dengue serology was done for all suspected subjects by enzyme-linked immunosorbent assay method. Detailed clinical and demographic details were taken at admission and serial close monitoring for signs and symptoms was done to watch for the progression of the disease. **Results:** Of the 100 children admitted with probable dengue fever, 57 had confirmed dengue illness. Of these 57 cases, most of the cases were male, and 34 (60%) cases were in age group of 5 months to 15 years with mean age of 7.5 ± 4.7 years. Among the serology confirmed cases, the most common presentation was fever in 57 (100%), followed by abdominal pain in 37 (65%), rashes in 31 (54%), myalgia in 26 (46%), and vomiting in 23 (40%) cases. The most common hemorrhagic manifestation was cutaneous bleeding manifestations like petechiae. Of 57 cases, 46 patients had dengue with no warning signs, 8 had dengue fever with warning signs, and 3 had severe dengue. **Conclusion:** Clinical manifestations of dengue seem to be changing. Fever, rash, and body ache are still the common manifestations; however, clinicians in the endemic areas should be aware of unusual and novel presentations such as fulminant hepatic failure, splenomegaly, and myocarditis also.

Key words: *Clinical manifestations, Dengue, Tertiary care hospital*

Dengue infection is a major health problem in India. Globally, the incidence of dengue has increased in the recent years. The WHO estimates that presently about two-fifths of the world population is at risk of this viral infection [1]. Dengue was first reported in 1780, when Benjamin Rush described this condition as “break-bone fever.” It is a mosquito-borne viral infection with infection four serotypes causing the [2]. India is one of the seven countries in the South-East Asia region, regularly reporting the incidence of dengue outbreaks due to its high incidence which constantly threatens the health care system. The first confirmed report of dengue infection in India dates back to 1940s, and since then more and more new states have been reporting the disease, which mostly strikes in epidemic proportions often inflicting heavy morbidity and mortality [3]. The leading causes for dengue infection are substandard living conditions, lack of vector control and climatic changes [4]. Dengue infections vary in severity, from influenza-like self-limiting illness to life-threatening dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) [5].

Infection with one serotype of dengue virus (DENV) provides lifelong immunity to that serotype, but results only in partial and transient protection against subsequent infection by the other three serotypes. Therefore, it is possible for a person to

be infected as many as four times, once with each serotype. It is well documented that sequential infection with different DENV serotypes increases the risk of developing dengue hemorrhagic fever (DHF). Ninety percent of the DHF occur in children <15 years of age. There is currently no specific treatment for DENV infection, although several potential vaccines are in development; therefore, the only method of preventing DENV transmission is vector control [6,7].

The common signs and symptoms observed are fever, headache, myalgia, arthralgia, and bleeding manifestations [6]. The exact clinical profile is important for the patient management and thus crucial for saving life. The Indian sub-continent has encountered recurrent dengue outbreaks from time to time with significant morbidity and mortality. Severity of the disease is more in children when compared to adults. This study attempts to delineate the salient clinical as well as laboratory findings of hospitalized children diagnosed as having dengue fever during the study period.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Pediatrics of a tertiary care hospital in

South India (Bangalore) after obtaining Institutional Ethical Committee approval. This study was done for 6 months duration (July-December 2013). After taking informed consent from the parents, we included children up to 15 years of age who were admitted with clinical diagnosis of dengue infection, diagnostic criteria based on WHO guidelines [1]. Dengue was suspected in child who lives or traveled to an endemic area and presented with fever with 2 of the following criteria - nausea/vomiting/rash/aches and pain/positive tourniquet test or leucopenia. For all these children, NS1, IgM and IgG antibodies to DENV were measured in acute and convalescent serum using enzyme-linked immunosorbent assay (ELISA) method [8].

Clinical and demographic details of every case were recorded in a case record form including symptoms, signs, laboratory, and radiological investigations. Detailed clinical examination was done at the time of admission followed by serial monitoring to assess the progression of disease. They were classified as dengue with no warning signs, dengue with warning signs, and severe dengue. Dengue with no warning signs were defined as laboratory-confirmed dengue cases with no signs of plasma leakage. Warning signs included intense abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleed, lethargy, restlessness, liver enlargement >2 cm, an increase in hematocrit with a rapid decrease in platelets. Severe dengue includes signs of plasma leakage with rising hematocrit leading to shock/fluid accumulation/respiratory distress and/or severe bleeding with organ involvement, and impaired level of consciousness. All these children were monitored by twice daily measurement of blood pressure, appearance of new signs and symptoms in the form of new rash, any bleeding manifestations, edema and deterioration of consciousness. Blood pressure was measured by using an appropriate age-matched cuff in the left arm, with the patient in supine position, twice daily and mean of measurements were taken. Tourniquet test was done in those children who did not have obvious bleeding manifestations.

Complete blood count including differential blood count, packed cell volume (PCV) and absolute platelet count (APC) was done by using coulter analysis method. PCV and APC were monitored serially once a day for all subjects in the study group. For children having symptoms suggestive of warning signs, they were monitored twice daily. Liver enzymes were measured routinely for all children at an interval of 3 days by using a semi auto-analyser. The abdominal ultrasonography was done by an experienced sonologist in those children who had abdominal pain. Dengue cases were classified and managed according to WHO guidelines [1]. The statistical analysis was done by using SPSS 16.020 software.

RESULTS

A total of 100 children were admitted with clinical diagnosis of dengue infection. Of them 57 turned out to be positive by either

NS1 or IgM or both. Among the 57 dengue serology positive cases, 46 had dengue fever with no warning signs, 8 had dengue with warning signs, and 3 had severe dengue. The affected children were between 5 months and 15 years of age with the mean age of 7.5 ± 4.7 years. Age wise distribution of cases is given in Table 1. 34 (59%) patients were male and 23 (41%) were female.

Fever was the clinical manifestation which was present in all 57 (100%) patients. Morbiform/maculopapular rashes were present in 31 (54%), myalgia in 26 (46%), severe headache in 22 (39%) and retro-orbital pain in 14 (25%) of the cases. In study population, abdominal pain was present in 37 (65%), vomiting in 23 (40%), generalized swelling in 12 (21%), and diarrhea in 4 (7%) patients. Totally, 31 patients had bleeding manifestations, of which 28 had cutaneous bleeding; 1 had mucosal bleeds and 2 patients had both cutaneous and mucosal bleed. Relative bradycardia was observed in 16 (28%) cases, and most of the patients with relative bradycardia were diagnosed to have dengue with warning signs Table 2.

Organomegaly was noted in 37 (65%) patients, out of which 25 had hepatomegaly, while 12 had hepatosplenomegaly. Ultrasonography of abdomen of all 37 patients revealed gall bladder wall edema. 2 patients had ascites and 3 patients had hypotension. Increase in hematocrit was noted in 8 patients and increase in aspartate aminotransferase >1000 was noted in 2 patients. Platelet count was <20,000 in 5 patients, 20,000-49,000 in 16 patients, 50,000-99,000 in 30 patients, >100,000 in 6 patients, respectively. Elevated CK (MB) levels and reduced left ventricular function was noted in one patient with dengue myocarditis.

Fever was treated with paracetamol, fluid balance was maintained by using normal saline. 5 patients who had platelet count <20,000 were given 4 units of platelet transfusion each. Their platelet counts came to normal limits within 5 days of treatment. In this study, one patient with dengue fever was associated with acute kidney injury Grade 2, with hypertension. The duration of hospital stay ranged between 4 and 12 days. There was no mortality in the study group during the study period.

DISCUSSION

This study describes the clinical profile, laboratory features, and outcome of dengue infection in the pediatric population under

Table 1: Age distribution of dengue fever in the study population

Age group (years)	Number of patients	Percentage
<1	2	3.52
1-5	11	19.29
6-10	23	40.35
11-15	21	36.84
Total	57	100

Table 2: Clinical, laboratory features and management of dengue illness

Clinical features	Number of patients with probable dengue (%)	Number of patients with dengue with warning signs (%)	Number of patients with severe dengue (%)
Fever	46 (100)	8 (100)	3 (100)
Rash	27 (58.7)	4 (50)	-
Myalgia	20 (43.4)	6 (75)	-
Retro-orbital pain	14 (30.4)	-	-
Headache	20 (43.4)	2 (25)	-
Vomiting	15 (32.6)	8 (100)	-
Abdominal pain	30 (65.2)	7 (87.5)	-
Diarrhea	-	4 (50)	-
Edema	2 (4.3)	8 (100)	2 (66.6)
Bradycardia	5 (10.8)	8 (100)	3 (100)
Mucosal bleed	-	1 (12.5)	2 (66.6)
Cutaneous bleed	21 (45.6)	7 (87.5)	2 (66.6)
Hepatomegaly	14 (30.4)	8 (100)	3 (100)
Splenomegaly	4 (8.6)	5 (62.5)	3 (100)
Ascites	-	-	2 (66.6)
Hypotension (<90/50 mmHg)	-	-	3 (100)
Thrombocytopenia	46 (100)	8 (100)	3 (100)
Rise in hematocrit	-	5 (62.5)	3 (100)
Rise in AST (>1000)	-	-	2 (66.6)
Management	Antipyretics, IV fluids and supportive care	Antipyretics, IV fluids, supportive care and platelet transfusion (2 patients with severe thrombocytopenia)	Antipyretics IV fluids supportive care and platelet transfusion

AST: Aspartate aminotransferase

15 years of age. Dengue is an important emerging disease of the tropical and sub-tropical regions. Since the first confirmed case of dengue in India, during the 1940s, intermittent reports from Delhi [9], Ludhiana [10], and Mangalore [11] and from other states have been published. The identification is by clinical features, but they can present with varied manifestation [9-11].

The present study describes the clinical manifestations, abnormalities in laboratory parameters, and outcomes of children admitted with dengue illness in a tertiary care hospital. Male children are affected more when compared to female children in this study, probably due to limited outdoor activity of females in that area. There is an increase in the number of dengue patients over the past few years. This is due to the rapid urbanization with unplanned construction activities and poor sanitation facilities contributing fertile breeding grounds for mosquitoes.

Increase in the alertness among medical fraternity following the initial epidemic and the availability of diagnostic tools in the hospital have contributed to the increased detection of cases [12]. In studies conducted from 2003 to 2006, no significance difference in incidence between rural and urban areas was noted [13]. The mean age group affected was 7.2 years, which is in accordance with WHO data that reports the modal age of 6-8 years for low-endemic areas [1].

Fever was the most common clinical feature in our study other being abdominal pain, rashes, myalgia, vomiting, headache, retro-orbital pain, relative bradycardia, and edema as reported in previous studies [14-17]. Bleeding manifestations in the form of cutaneous skin bleeds were observed in majority of patients [18]. Skin bleeding was the most common hemorrhagic manifestation, which is in contrast to a previous study showing epistaxis as the most common form of bleeding [19]. Children with bleeding tendencies were not necessarily those having low platelet count, indicating a combination of causes such as thrombocytopenia, coagulopathy, and vasculopathy leading to bleeding manifestations [20].

One patient had evidence of myocarditis characterized with sinus bradycardia, increased CK-MB levels and decreased left ventricular functions, who improved with proper supportive care. Cardiac manifestations in dengue infection include bradycardia, which is the most common finding, although second degree AV block, ST elevation and rarely atrial fibrillation have been noted [21].

Incidence of occurrence of abdominal pain and hepatomegaly were not found to be significantly different among various groups. All the patients with abdominal pain in the study population showed distended gall bladder with wall

edema. Kulkarni et al. found that significantly greater number of children in DHF group had pain abdomen, hepatomegaly and bleeding tendencies, and concluded that abdominal pain and tender hepatomegaly may predict DHF and should be closely monitored for DSS [18]. Narayanan et al. found that hepatomegaly, positive tourniquet test, elevated haematocrit and thrombocytopenia were more common in DHF and DSS group [6]. Gupta et al. also highlighted gallbladder wall edema as a useful diagnostic finding that may help in prognostication in serology proven pediatric DHF [22]. In our study, we have found an increased incidence of splenomegaly among dengue infected cases, which were significantly higher among the group of dengue fever with warning signs.

In our study, all dengue diagnostic tests were done by ELISA method. The limitation of our study is that, the study population is less in number. Therefore, it is necessary to conduct these studies in large study population and multi-centric trial should be conducted.

CONCLUSION

Dengue is one of the major causes of undifferentiated fever presenting as a highly non-specific illness; therefore, posing difficulty in recognizing as a clinical entity. Clinicians in endemic areas thus should be aware of the clinical profile of dengue infection for appropriate management that can improve the outcome of this potentially morbid and occasionally fatal disease in a pediatric population.

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