



A CLINICAL STUDY OF MANIFESTATIONS OF DENGUE FEVER AND THEIR CORRELATION WITH THE LABORATORY FEATURES IN CHILDREN

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ABSTRACT

Objectives: Dengue fever is one of common infectious illnesses in childhood requiring hospital admission. A prospective study was undertaken in a dengue endemic setting to analyze clinical features and their correlation with the laboratory findings.

Methods: The study was prospective and observational. 106 consecutive patients aged between 3 months to 15 years admitted with a diagnosis of dengue fever were included. The diagnosis was made based on the recent WHO guidelines. Among these cases hematocrit (HCT), platelet count, chest x-ray and dengue NS1, IgG and IgM were analyzed.

Results: 41 cases (38.6%) had severe dengue fever. There was a strong statistical correlation between clinical bleeding and platelet counts ($p < 0.05$). Pleural effusion was more common on the right side than the left. Overall mortality was 5.66%. Children who had respiratory distress at the time of admission had a higher mortality rate ($p < 0.05$).

Conclusions: Our study correlates bleeding and degrees of thrombocytopenia like other studies. [5,6] High positivity of NS1 in early disease and IgM later correlate with other studies. [1]

Right sided pleural effusion was more common in our study contrary to literature given in standard textbook of pediatrics.[2] Mortality was higher in those who presented with respiratory distress and circulatory failure at the time of admission.

KEYWORDS : dengue fever, platelet count, pleural effusion, children

Introduction

Dengue fever is one of common serious illness in Childhood requiring hospital admission. Dengue fever and especially more severe dengue fever ranks highly among the new and newly emerging infectious diseases in public health significance and is considered as the most important of the arthropod borne viral diseases [3]. Proliferation in density and geographic distribution of vector and marked increase in rate and geographic range of virus transmission have led to resurgence of dengue in recent years. Major demographic changes such as uncontrolled population growth, unplanned urbanization resulting in substandard housing and need for water storage has greatly aided vector proliferation [4]. Our area being endemic to dengue fever a prospective study was undertaken to analyze clinical features and correlate with laboratory findings. Aim of study was to determine common clinical features of dengue fever and to correlate with laboratory findings.

Materials and methods: A prospective study was undertaken at SDM Institute of medical sciences Hospital, a tertiary care Hospital at Dharwad, Karnataka state from June 2009 to July 2010.

106 patients aged between 3 months to 15 years with dengue fever admitted to our hospital were prospectively studied. The diagnosis was made based on WHO clinical criteria [1]. Clinical features being fever, headache, rashes, myalgia, abdominal pain, bleeding manifestations and hepatomegaly. Laboratory features included are HCT, platelet count, NS1 antigen, dengue IgM and IgG antibody. Correlation with Chest x-ray was also studied. Clinical and laboratory data were documented in a predesigned structured proforma by one of the investigators.

Cases not fitting to WHO criteria were excluded from study.

Consent and ethical approval

The study was approved by the institutional ethics committee. Informal consent was taken from the parent/care taker of the child.

Management of patients: patients diagnosed as dengue fever were treated as inpatients as per WHO guidelines [1].

Results:

Table 1 Age group: n=106

0-1 year	1-5 year	5-10 year	>10year
3(3.0%)	30(28%)	46(44%)	27(25%)

Youngest child being 3 months old had fever, rashes, bleeding and hepatomegaly. Dengue fever was more common between 5-10 years of age.

Table 2 Clinical features: n=106

Fever	95%
Rashes	60%
Headache	65%
Myalgia	60%
abdominal pain	40%
Hepatomegaly	80%
Bleeding	20%

Table 3 Laboratory features: HCT n=106

<35%	40%
>35%	60%

Table 4 Platelet count n=106

	Total n=106	Bleeding n=21
<50000/cumm	79 (75%)	16 (76%)
50000 – 100000	11 (10%)	3 (14%)
>100000/cumm	16 (15%)	2 (10%)

85% of patients with dengue fever had thrombocytopenia. Bleeding manifestations (76%) were more common in patients with thrombocytopenia <50,000/cumm.

Table 5 Association between platelet count and bleeding

Bleeding manifestations	Platelet <100,000	Platelet >100,000
skin	10/90	2/16
gums	4/90	Nil
epistaxis	2/90	Nil
hematemesis	4/90	Nil
malena	16/90	Nil
No bleeding	71/90	14/16

Association between thrombocytopenia and bleeding was carried out. Bleeding was more frequent in children with thrombocytopenia. 19 out of 90 patients who had thrombocytopenia <100000/cumm presented with bleeding (21%) versus 2 out of 16 who had platelet count >100000/cumm had no bleeding (12.5%)

Table 6 Chest x-ray: n=106

Normal	32(30%)
Pleural effusion	Right sided 69(65%) Bilateral 4(4%) Left side 1(1%)

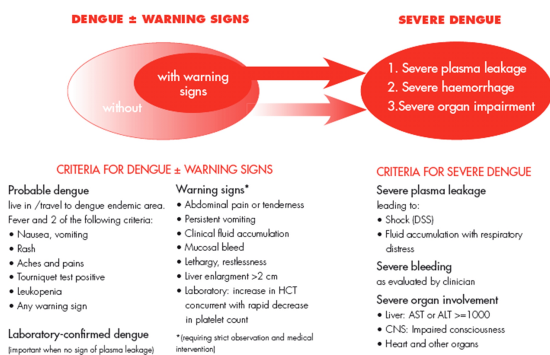
Table 7 NS1, IgG and IgM antibody:

	NS1	IgG	IgM
positive	82%	72%	70%
negative	18%	28%	30%
Total cases	48	63	63

41 out of 106 patients had severe dengue fever as per WHO criteria [1]. These patients had signs of plasma leak, circulatory failure, with or without bleeding manifestations. 20 out of 41 patients with severe dengue fever had dengue shock syndrome. Dengue shock syndrome presented with fever, rashes, myalgia, pain and distention of abdomen, tachycardia, and low blood pressure with or without obvious clinical bleeding. 8 patients had respiratory distress at the time of admission. One child presented with liver failure and one child presented like encephalitis. Severe dengue fever were admitted in intensive care unit, monitoring and treatment was given as per WHO guidelines [1]. 8 patients required ventilation out of which 2 survived. Those who had respiratory distress requiring ventilation had poor outcome. Mortality rate 6/106 being 5.66%.

Discussion: Dengue fever is an acute viral illness characterized by fever, myalgia, headache pain abdomen and rashes. Severe dengue fever is characterized by bleeding and/or plasma leak which may cause circulatory failure. WHO guidelines for dengue fever [1].

Figure 1.4 Suggested dengue case classification and levels of severity



In our study 106 cases admitted with dengue fever and 41 were severe dengue fever as per WHO case definition [1]. In our present study 5-10 years age group children with dengue illness consists of half of the total cases (44%). This is in accordance with the WHO data that reports model age of 6-8 years for endemic areas [5].

Youngest child admitted was 3 months old had fever, rashes, hepatomegaly and bleeding in the form of malena. Baby had raised HCT and thrombocytopenia and positive for dengue NS1 and IgM antibody. Baby made a full recovery in 5 days.

Fever, myalgia and rashes were seen in 95% of patients where as hepatomegaly seen in 80% of patients in other studies.

The common clinical features noted were fever, rashes, myalgia, abdominal pain, hepatomegaly were not found to be significant risk factors in predicting bleed in the present study as compared with the study done by So. Shivbalan et al [6]. Hepatomegaly present in 80% of cases as compared to 87% in study done by Vinod H ratgeri et al [7].

The common bleeding manifestations were malena (17.7%) and skin bleeds (11%) compared to study by Aggarwal et al [8] and Manjunath J Kulkurniet al [5] where epistaxis (25%) was the common spontaneous bleeding manifestation.

Among the laboratory investigations, hematocrit and platelet count was done for all the children. The extent of hemoconcentration in our study was quantitated by taking the difference between the maximum hematocrit at admission or anytime during the hospital stay and the minimum hematocrit recording at the convalescence or discharge. Hematocrit of >35% is seen in 60% of the total 106 cases. In the present study low hematocrit probably due to high prevalence of anemia in this part has been noticed. There are no clear cut guidelines for haemoconcentration in Indian population [7]. Gomber et al in their study define the cut off hematocrit value of 36.3% in the 6-12 years age group as diagnostic of sever dengue [9].

Raised HCT was seen in 60% of patients where as thrombocytopenia <100000/cumm was seen in 85% of patients. In our study thrombocytopenia was more common criteria than raised HCT.

There was a correlation between clinical bleeding and degree of thrombocytopenia. Frequency of bleeding manifestations increased with decreasing platelet count. Total 21 cases with bleeding, 16(76%) cases have platelet count of <50,000/cumm and 3(14%) cases with platelet count of 50,000-100000/cumm and total <100000/cumm had 90% whereas platelet count >100000/cumm had insignificant bleeding (skin bleeds). This is in comparison with other studies by Manjunath J kulkurni et al [5] and Shivbalan et al. [6] A study by kabra S K et al found that risk of spontaneous bleed has been associated with a platelet count <20,000/cumm [10]. A study conducted at Delhi by Sunil gomber et al [9] concluded that there was no significant difference in bleeding manifestations among thrombocytopenic and non thrombocytopenic patients with dengue.

Chest x ray was very useful. 70% had pleural effusion out of which right side pleural effusion was more frequent 65% cases, bilateral 4% and left side 1% case. In our study right sided pleural effusion was more common (65%) case in comparable with the study done by Vinod h ratgeri et al.[7]. This inference is contrary to literature given in standard textbook of pediatrics [2].

NS1 antigen is a very useful tool to diagnose dengue fever in first 5 days of illness after which IgM will become positive. In our study NS1 antigen was positive in 82% of cases followed by IgM in 70% cases.

20 out of 41 cases with sever dengue fever had dengue shock syndrome. Severe dengue cases were admitted in pediatric intensive care unit, monitoring and treatment was given as per WHO guidelines. Out of 8 patients required ventilation two patients survived.. Mortality rate 6/106 being 5.6% as compared with the study done by Manjunath J Kulkurni et al.[5] with 1.1% mortality. High mortality in our present study can be explained by lack of awareness, late referral and long distance travelled by our patients before admission.

Conclusion:

Our study correlates bleeding and degrees of thrombocytopenia like other studies. [5,6]

Right sided pleural effusion was more common in our study contrary to to literature given in standard textbook of pediatrics. [2]

High positivity of NS1 in early disease and IgM later correlate with other studies. [1]

Mortality was higher in those who presented with respiratory distress and circulatory failure at the time of admission.

Key messages:

Clinical bleeding was related with degree of thrombocytopenia.

Right sided pleural effusion is more common than left.

Respiratory distress requiring ventilation carry poor prognosis.

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Conflicts of interest – none

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