

Original Research Article

Clinical profile and outcome of dengue fever among children in tertiary care hospital

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ABSTRACT

Background: Dengue viral infection is the most common mosquito-borne disease in the world with varied presentations, high morbidity, and high mortality patterns. To study the clinical profile and outcome of dengue fever in children.

Methods: This analytical study was conducted in children less than 12 years of age with clinical features of dengue (any acute febrile illness with one of the following: myalgia, headache, retro-orbital pain, bleeding, altered sensorium, shock, or low platelet count) presented at Mahavir institute of medical sciences between February 2019 to January 2020 (12) months were included in the study. Children positive for IgM alone or both IgM and IgG were followed up for a clinical profile.

Results: Seizures (9.5%), loose stools (8.5%), lymphadenopathy (15.2%), relative bradycardia (8.5%) were less common manifestations. Rashes were seen in 64.7% of children. Many children in this study were mildly anemic. Mean hemoglobin was slightly higher in dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). Mean Hb in DSS was 11.28 g%. It was 10.02, 10.1, and 10.45 in DF, DFB, DHF respectively. But it was statistically not significant ($P=0.27$).

Conclusions: Seizure was significant in DSS cases. Any dengue child throwing convulsions should hence be promptly evaluated for an unrecognized shock. The bleeding in dengue is not purely due to thrombocytopenia. There is no role for prophylactic platelet transfusion.

Keywords: Dengue fever, Dengue hemorrhagic fever, Dengue shock syndrome

INTRODUCTION

Dengue fever is one of the arthropod-borne diseases that are on the rise in India. Dengue fever (DF) and dengue hemorrhagic fever (DHF) have emerged as a global public health problem.¹ dengue is hyperendemic in many urban, periurban, and rural areas with frequent epidemics. The south-east Asia region is one of the regions at the highest risk of DF/DHF accounting for 52% of global risk.² Typically, people infected with the dengue virus are asymptomatic or have mild symptoms (80%), others have

more severe illness (5%), and in a small proportion, it is life-threatening. Severe disease is more common in infants and young children and in contrast to many other infections, it is more common in well-nourished children.³ According to World Health Organization (WHO) criteria 2009, patients are classified as severe dengue if they have manifestations of severe plasma leakage, severe hemorrhage, or severe organ impairment. THE rapid increase in dengue cases in 2019 became a public health concern in Eastern India as the majority of cases were affecting young adolescents.^{4,5} The objective

of this study was to assess the clinical profile of the dengue infection in children less than 14 years of age and to evaluate the outcome of dengue fever in the southeastern part of India where dengue outbreaks are rampant.

METHODS

This analytical study was conducted in Children less than 12 years of age with clinical features of dengue (any acute febrile illness with one of the following: myalgia, headache, retro-orbital pain, bleeding, altered sensorium, shock, or low platelet count) presented at Mahavir institute of medical sciences between February 2019 to January 2020 (12) months were included in the study.

For all cases, the rapid IgM, IgG ELISA test was done. Children positive for IgM alone or both IgM and IgG were followed up for a clinical profile. Cases of enteric fever, leptospirosis, malaria were excluded by appropriate investigations. The number of children included based on the above criteria was 105.

Seropositive children were classified based on WHO criteria (2) as follows: Dengue fever (DF): dengue seropositive without bleed. Dengue fever with unusual bleed (DFB): dengue seropositive with bleeding tendencies, not satisfying WHO criteria for DHF. Dengue hemorrhagic fever (DHF): dengue seropositive with bleeds with evidence of plasma leakage. Dengue shock syndrome (DSS): DHF with evidence of peripheral circulatory failure.

Laboratory investigations carried out in these patients included hemoglobin, blood counts, hematocrit, liver function tests, etc. Chest X-ray was taken to demonstrate pleural effusion. Ultrasound abdomen was done to identify ascites, polyserositis, and gall bladder wall thickening. CSF analysis was done in patients with convulsions, meningeal signs, and altered sensorium. children tested positive for dengue serology with clinical features of dengue were included in study. Children with negative dengue serology were excluded from study.

Statistical analysis

Data entry was made in the Microsoft Excel software in codes and analysis was done with an SPSS version 20 computer package. Categorical variables are expressed as percentages whereas continuous variables are expressed as mean±standard deviation. Association between the categorical variable was found by the chi-square test and the relationship between the continuous variable was assessed by student's t-test.

RESULTS

Total 105 seropositive dengue cases were reported in our hospital during the study.

Dengue fever: 24 (22.8%), dengue fever with unusual bleeds: 32 (30.4%), dengue hemorrhagic fever: 29 (27.6%), dengue shock syndrome: 20 (19.04%).

Table 1: Age distribution.

S. no.	Feature		Total	DF	DFB	DHF	DSS	P value
1	Mean age	Year (SD)	5.6 (3.2)	6.1 (3.9)	5.7 (3.1)	6.1 (3.2)	4.04 (3.39)	0.32
2	Male sex	N (%)	56 (53)	11 (45)	17 (53)	18 (62)	10 (50)	0.70
3	Age ≤1 year	N (%)	11 (10.4)	1 (4.1)	3 (9.4)	1 (3.4)	6 (30)	0.216
4	1-5 year	N (%)	42 (40)	11 (45.8)	11 (34.4)	13 (44.8)	7 (35)	1.0
5	5-12 year	N (%)	52 (49.5)	13 (54.1)	17 (53.1)	15 (51.7)	7 (35)	0.43
6	Mean duration of fever	Days (SD)	5.09 (2.3)	4.95 (2.1)	5.25 (2.5)	5.24 (1.8)	4.8 (2.7)	0.34

Table 2: Clinical features.

S. no.	Feature		Total	DF	DFB	DHF	DSS	P value
1	Fever	N (%)	105 (100)	24 (100)	32 (100)	29 (100)	20 (100)	-
2	Myalgia	N (%)	66 (62.8)	16 (66.6)	23 (71.8)	21 (72.4)	6 (30)	0.47
3	Headache	N (%)	22 (20.9)	4 (16.6)	5 (15.6)	9 (31)	4 (20)	0.53
4	Abdominal pain	N (%)	39 (37.1)	5 (20.8)	9 (28.1)	19 (65.5)	6 (30)	0.41
5	Vomiting	N (%)	86 (81.9)	16 (66.6)	25 (78.1)	25 (86.2)	20 (100)	0.0049
6	Altered sensorium,	N (%)	68 (64.7)	7 (29.1)	17 (53.1)	24 (82.7)	20 (100)	0.023

Table 1 shows the age group of the affected children was between 5 months to 12 years. (mean 5.6 years, standard deviation 3.2). DSS occurred in a relatively younger age group (mean 4.04 years). But it was statistically not

significant (P=0.32). Infants comprised 10.4% of the total study group. 40% were children between 1 and 5 years of age. 49.5% were children between 5 and 12 years. The mean duration of fever was 5.09 days. It was 4.95, 5.25,

5.24, 4.8 days in DF, DFB, DHF, DSS respectively. Males were affected slightly more than females. It was not significant (P=0.70).

Table 2 shows most common manifestations were fever (100%), vomiting (81.9%), bleeding manifestations (77.14%), rashes (64.7%) and myalgia (62.8%). Fever was continuous, biphasic, and intermittent in 70.4, 20.9, and 8 percentages respectively. Myalgia was less commonly noted in DSS. But it was statistically not significant (P=0.47). Vomiting was present in all DSS children (100%). When compared to the DF group (66.6%) it is statistically significant (P=0.0049). All DSS had altered sensorium (100%). When compared to the DF group (29.1%), it is statistically significant (P=0.023).

Table 3 shows out of 105 children, 81 had one or more form of bleeding manifestations. Bleeding from more than one site was the most common manifestation (P=0.001). Petechiae (17.1%), tourniquet +ve test (26.7%), hematemesis (11.4%), malena (11.4%), epistaxis (1.9%), purpura (0.95%) were other manifestations. Hepatomegaly was present in 90% in

DSS and 86.2% in DHF. It was statistically significant when compared with DF and DFB (P=0.0219).

Table 3 shows one DF child presented with shock. But there were no signs suggestive of plasma leakage. That child had improved with two boluses of normal saline. Third spacing was seen in 49 children (46.6%). In DHF, 6 had only pleural effusion, 23 had both pleural effusion and ascites. In DSS 2 had only pleural effusion, 18 had both pleural effusion and ascites.

Pleural effusion was bilateral in 2 children. Seizures (9.5%), loose stools (8.5%), lymphadenopathy (15.2%), relative bradycardia (8.5%) were less common manifestations. Rashes were seen in 64.7% of children. Many children in this study were mildly anemic. Mean hemoglobin was slightly higher in DHF and DSS. Mean Hb in DSS was 11.28g%. It was 10.02, 10.1, and 10.45 in DF, DFB, DHF respectively. But it was statistically not significant (P=0.27).

Table 3: Bleeding profile.

Sr. no	Feature		Total	DF	DFB	DHF	DSS	P value
1	Epistaxis	N (%)	2 (1.9)	0 (0)	1 (3.1)	1 (3.4)	0 (0)	0.82
2	Malena	N (%)	12 (11.4)	0 (0)	6 (18.75)	4 (13.8)	2 (10)	0.65
3	Hematemesis	N (%)	12 (11.4)	0 (0)	4 (12.5)	4 (13.8)	4 (20)	0.73
4	IV bleed	N (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	-
5	Petechiae	N (%)	18 (17.1)	0 (0)	13 (40.6)	5 (17.2)	0 (0)	0.61
6	Purpura	N (%)	1 (0.95)	0 (0)	1 (3.1)	0 (0)	0 (0)	-
7	Echymosis	N (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	-
8	>1 site, (hematemesis+petechiae)	N (%)	36 (34.3)	0 (0)	7 (21.9)	15 (51.7)	14 (70)	0.001
9	None	-	24	0	0	0	0	--

Table 4: Clinical features.

Sr. no.	Feature		Total	DF	DFB	DHF	DSS	P value
1	Hepatomegaly	N (%)	53 (50.5)	3 (12.5)	7 (21.9)	25 (86.2)	18 (90)	0.0219
2	Tourniquet +	N (%)	28 (26.7)	0 (0)	9 (28.1)	12 (41.4)	7 (35)	0.35
3	Shock	N (%)	21 (20)	1 (4.1)	0 (0)	0 (0)	20 (100)	0.001
4	3rd spacing	N (%)	49 (46.6)	0 (0)	0 (0)	29 (100)	20 (100)	-
HB and PCV								
5	Hb	Mean (SD)	10.4 (1)	10.02 (1.05)	10.1 (0.95)	10.45 (0.9)	11.28 (0.59)	0.27
6	Hematocrit	Mean (SD)	34.06 (5.5)	30.8 (2.6)	30.65 (2.8)	37.27 (6.9)	38.75 (1.11)	0.0141

Table 5: Ultrasound abdomen.

Sr. no.	Feature		Total	DF	DFB	DHF	DSS	P value
1	Hepatomegaly,	N (%)	56 (53.3)	2 (8.3)	6 (18.75)	28 (96.5)	20 (100)	0.0017
2	Polyserositis	N (%)	16 (15.2)	0 (0)	1 (3.1)	10 (34.4)	5 (25)	0.0032
3	Gall bladder wall thickening	N (%)	26 (24.7)	0 (0)	0 (0)	13 (44.8)	13 (65)	0.001
4	Ascites	N (%)	41 (39.04)	0 (0)	0 (0)	23 (79.3)	18 (90)	0.001
5	Normal study	N (%)	49 (46.6)	22 (91.6)	26 (81.25)	1 (3.4)	0 (0)	0.001

Table 6: Outcome.

Sr. no.	Feature	Total	DF	DFB	DHF	DSS	P value	
1	Recovery	N (%)	103 (98.1)	24 (100)	32 (100)	29 (100)	18 (90)	0.0348
2	Death	N (%)	2 (1.9)	0 (0)	0 (0)	0 (0)	2 (10)	0.0348

Table 4 shows as many children were mildly anemic, the mean hematocrit value also relatively low. In DHF and DSS mean hematocrit was significantly higher than classical DF and DFB ($P=0.0141$). In DFB, DHF, DSS low platelet counts correlate with bleeding manifestations ($P=0.025$). SGOT and SGPT levels were elevated in all groups. Elevation of SGOT and SGPT were significantly higher in DHF and DSS when compared with classical dengue and DFB ($P=0.001$).

Table 5 shows ultrasound abdomen, DHF (96.5%) and DSS (100%) had hepatomegaly. It is statistically significant when compared with DF and DFB ($P=0.0017$). Polyserositis also significantly more in DHF and DSS group ($P=0.0032$). Gall bladder wall thickening was noted in 44.8% in DHF and 65% in DSS. No children in DF or DFB had gall bladder wall thickening. It is statistically significant ($P=0.001$). 49 children had no abnormalities in the ultrasound abdomen. Children in DF and DFB had more reports of normal ultrasound abdomen ($P=0.001$). No children in the DSS group had a normal study.

Table 6 shows out of 105 children, 103 were recovered from the illness. Two children from the DSS group died. Both were brought to the hospital very late. Duration of hospital stay was less than 24 hours in both the children. The overall recovery rate was 98.1%. IN DF, DFB, DHF all children were recovered. The recovery rate in the non-DSS group was significantly higher than DSS ($P=0.0348$). Mortality due to DSS was 10%. This is significantly higher than the non-DSS group ($P=0.0348$). Overall mortality was 1.9%.

DISCUSSION

A total of 105 cases of seropositive dengue children presented at the Institute of Social Pediatrics were analyzed. According to WHO classification, Dengue fever (including DFB) (53.2%), Dengue hemorrhagic fever (27.6%), Dengue shock syndrome (19.04%) was seen. Incidence of DHF and DSS was increased when comparing the study by Ha DQ, Tien et al.⁷ It may be due to increasing endemicity, environmental factors, and changing virulence of the viruses.⁸ In present study, infants (10.4%), 1-5 years (40%), 6-12 years (49.5%) was observed Halstead SB et.al 20%, 28.7% for infants and 1-5 years group. He reported that 6-15 years formed 51%. In the present study, <5 years were 50.4%. More than 5 years was 49.5%. Continuous (74%), Biphasic (22%), Intermittent (9%) was seen in the present study. The mean duration of fever was 5.09 days.⁹ Huang, 4.9 days. It was lesser in DSS (4.8 days) and statistically not

significant ($P=0.34$). It is comparable to other studies. It was significantly more common in the DSS group ($P<0.05$). Bleeding from more than one site (hematemesis+petechiae) was the most common in the present study. Hematemesis was most common in other studies. Its percentage is variable in different studies.¹⁰ DSS was low in Kabra et al Due to increasing endemicity and changing epidemiology, DSS is an increasing trend. It is 100% in DHF and DSS in the present study.¹¹ Kalayanarooj et al reported 38.34%. In my study, there is a wide prevalence of mild anemia and low hematocrit. The mean hematocrit value was significantly higher in DHF and DSS groups. They are elevated by 71.4%. Elevation in DHF and DSS was statistically more common than in DF and DFB.¹² It was also seen King et al in severe dengue (DHF and DSS), ascites, gall bladder wall thickening, and hepatomegaly were significantly more common in the present study ($P<0.05$). The above studies also reveal the same. GBWT more than 5 mm in clinically suspected dengue cases signifies 91.7% specificity towards DHF and DSS.¹³ According to Kuno, et al mortality due to dengue in Asian countries is 0.5%-3.5% (if early recognition and appropriate treatment were instituted). Mortality in my study is 1.9%. Mortality rate is drastically reduced by early recognition, precise assessment, and appropriate fluid management as per WHO protocol.¹⁵

Limitations

There are certain limitations in our study. Interpretation of this study should be done bearing in mind that it is a retrospective single center study involving patients admitted in the intensive care unit. However, this study sheds light onto the factors which could predict mortality among patients admitted with dengue to critical care unit.

CONCLUSION

Dengue fever is becoming more prevalent in India. The incidence of dengue shock syndrome is increasing. Vomiting, hematemesis, skin bleeds, altered sensorium, hepatomegaly, elevated SGOT, SGPT, gall bladder wall thickening, ascites, pleural effusion following the period of fever defervescence strongly indicate dengue haemorrhagic fever and dengue shock syndrome. The bleeding in dengue is not purely due to thrombocytopenia. It is due to multiple etiologies including vascular changes. No role for prophylactic platelet transfusion. Early recognition, precise assessment, and appropriate treatment have reduced mortality. Parental health education about the fever

defervescence and early referral may prevent deaths due to dengue.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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