Indicators of Dengue Severity: A Transversal Study

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ABSTRACT

A hospital based clinical study was conducted in the Department of Paediatrics during 2016-2017to understand the clinical manifestations and outcome of dengue fever. Out of 50 cases, 25 cases (50%) were diagnosed as dengue fever without warning signs, followed by 20 cases (40%) of dengue fever with warning signs, while 5 cases (10%) were diagnosed as severe dengue. Fever, petechiae and abdominal pain were common clinical manifestations. Hepatomegaly, pallor and ascites were common clinical examination findings. Thrombocytopenia was the commonest hematological abnormality (88%). Mortality in the present study was 6%. All patients who expired were in severe dengue group. Refractory shock and coagulopathy was present in 2 out of 3 cases. One child died of refractory shock with ARDS. Two children with severe dengue recovered without sequalae.

KEY WORDS: bundelkhand, clinical profile, dengue fever, laboratory profile

INTRODUCTION:

Dengue has recently become a major public health problem causing significant morbidity, mortality and economic loss. Dengue is endemic in more than 100 countries. Worldwide around 2.5 billion people live in dengue prone regions and about 100 million new cases are detected each year[1]. WHO 2009 classification divides dengue fever into two groups: uncomplicated and severe;[2], though the 1997 WHO classification is still widely used, classifying dengue in to 3 groups: dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS)[3,4]. The resurgence of dengue has been observed in India and varied clinical presentations are being reported in the outbreaks from different geographical locations[5-11]. The relationship of India with dengue has been long and intense. The first recorded epidemic of clinically dengue like illness occurred at Madras in 1780. The first full-blown epidemic of the severe form of the illness, the dengue hemorrhagic fever/ dengue shock syndrome occurred in North India in 1996. Surveys conducted by the health ministry indicate that the dengue prevalence rate was 3.4 percent in 2006, rising to 5.25 percent in 2007, and by 2009 to 9.1 percent[5-11].

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MATERIALS AND METHODS:

This study was carried out in Department of Paediatrics of Maharani Laxmi Bai Medical College, Jhansi U.P. form September 2016 to October 2017. The objectives of the study were to categorise the Dengue fever cases according to WHO classification 2009 among the paediatric admissions, to study and find out various clinical manifestations of dengue fever and correlate the outcome with clinical, laboratory and management parameters. This study is an institutional research and ethical committee approval has been taken for it.

All serologically confirmed (IgM positive alone or both IgM and IgG) or NS1 antigen positive dengue fever patients were included in study. All such patients who were admitted in the hospital underwent detailed clinical examination and investigation. All the dengue fever cases are classified according to the WHO grading system (WHO, 2009) as follows: (a) Undifferentiated fever; (b) Dengue without warning signs; (c) Dengue with warning signs and (d) Severe dengue infection.

Warning signs are abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleed, lethargy, restlessness, liver enlargement >2 cm and laboratory features like increase in packed cell volume (hematocrit) with

concurrent with rapid decrease in platelet count.

Demographic information was collected and a detailed general examination was conducted in each case. Due emphasis was taken to access general condition, pulse rate, respiratory rate, temperature, level of hydration, chest auscultation, organomegaly, saturation, blood pressure, level of orientation. Dengue NS1 antigen, dengue IgG and IgM antibody were taken as diagnostic criteria for dengue fever.

RESULTS:

The study group consisted of 50 cases of dengue fever between 1-18 years of age group out of which 66% were male and 34% were female cases with male to female ratio being 1.94:1. Majority of cases were diagnosed as dengue fever without warning signs (50%), followed by dengue fever with warning signs (40%), while 10% cases were diagnosed as severe dengue (table1).

Fever was observed in all cases (100%), petechiae (62%) was the next most common clinical sign, followed by symptoms like abdominal pain (58% cases), vomiting (36% cases), headache (34% cases), abdominal distension (20% cases), malena (16% cases) and epistaxis (10% of cases). In clinical examination, hepatomegaly (36% cases) was the commonest clinical sign, followed by pallor (26% cases), ascites (12% cases), icterus (10% cases), pleural effusion (10% cases) (Table 2 & 3). Thrombocytopenia (<100,000 cells/mm3) was seen in 44 cases (88%), while severe thrombocytopenia (<50,000 cells/mm3) was seen in 25 cases (50%). Evidence of increased capillary permeability (hematocrit increased by >20%) was seen only in 11 cases (22%). NS-1 antigen was positive in 46 patients (92%), Ig M antibody was positive in 10 cases (20%), while IgG antibody was positive only in 3 cases (6%) (table IV). 47 (94%) patients were discharged successfully while 3 (6%) patients expired (table V). Mortality in the present study was 6%. All patients who expired were in severe dengue group. Refractory shock and coagulopathy was present in 2 out of 3 cases. One child died of refractory shock with ARDS. Two children with severe dengue recovered without sequalae. Forty seven (94%) patients were discharged successfully while 3 (6%) patients expired. Discharge rate in dengue fever with and without warning sign group was 100%, while discharge rate in severe dengue was only 40%. Mortality rate in dengue fever with and without warning sign group was zero percent while in severe dengue, mortality rate is 60 %. Overall mortality rate was 6%.

Table 1: Distribution of dengue patients according to diagnosis.

Diagnosis	Male	Female	Total (percentage)
DF without warning signs	16	9	25 (50%)
DF with warning signs	16	4	20 (40%)
Severe dengue	1	4	5 (10%)
Total	33	17	50

Table 2: Various clinical manifestations of our cases.

	No. of patients with Manifestations	Percentage
Fever	50	100%
Rashes/Petechiae	31	62%
Abdominal pain	29	58%
Vomiting	18	36%
Headache	17	34%
Abdominal distension	10	20%
Malena	8	16%
Epistaxis	5	10%

Table 3: Distribution of dengue patients according to clinical examination findings.

Examination	No. of patients with Manifestations	Percentage
Hepatomegaly	18	36 %
Pallor	13	26 %
Ascites	6	12 %
Icterus	5	10 %
Pleural effusion	5	10 %

Table 4: Distribution of dengue patients according to serology.

	No. of patients	Percentage
NS-1 Ag	46	92%
IgM Ab	10	20%
IgG Ab	3	6%

DISCUSSION:

Among 50 children studied herein the common age group affected was between 10 to 16 years, with almost equal male to female ratio. In present study, fever was observed in all cases (100%). 10 children had the typical biphasic pattern of fever with an afebrile period of 3-5 days. In most of the cases rash was seen during the convalescent phase of the disease which was macular with annular clear zones and pruritis.

Table 5: Mortality in different age group.

	<5 years	6 to 10 years	>10 years	Total
Total no. of patients	6	21	23	50
Discharged	6	20	21	47 (94%)
Expired	0	1	2	3
Expiry percentage	0 %	4.76 %	8.69 %	6%

Evidence of increased capillary permeability, in form of ascites (12%) and pleural effusion (10%) was seen only in severe dengue or in dengue fever with warning signs.

Thrombocytopenia in our study, was graded into two category. Cases with platelet count below 50,000 cells/mm3 were graded as severe thrombocytopenia, while platelet count less than 100,000 cells/mm3 was designated as only thrombocytopenia. Thrombocytopenia (<100,000 cells/mm3) was seen in 44 cases (88%), while severe thrombocytopenia (<50,000 cells/mm3) was seen in 25 cases (50%).

In our study Dengue fever was also categorised by increase in hematocrit in number of patients which signifies haemoconcentration. It was observed that only 11 (22%) cases had significant increase in hematocrit, 23 (46%) cases had <20% increase in hematocrit, while in 16 (32%) cases a fall in hematocrit was seen. Hence evidence of increase capillary permeability (hematocrit increased by >20%) was seen only in 11 cases (22%).

Diagnosis of dengue fever was confirmed by the positivity of NS-1 antigen and the subsequent antibody response of IgG and IgM. NS-1 antigen was positive in 46 patients (92%), Ig M antibody was positive in 10 cases (20%), while IgG antibody was positive only in 3 cases (6%). It is obvious that most of the cases (92%) were positive for NS-1 Ag. Our observations were similar to those reported by *Padbidiri HI. et al., (1995)* and *Dash et al., (2005)* who reported positivity of IgM antibody 25% and 22% in their respective studies, while *Rama devi G.V. etal (2011)* reported 31 % positivity of IgM antibody in their study [15-17].

Mortality in the present study was only 6%. All patients who expired were in severe dengue group. Refractory shock and coagulopathy was present in 2 out of 3 cases. One child died of refractory shock with ARDS. Two children with severe dengue recovered without sequalae.

In cases of dengue fever, mortality was maximum in >10 years of age group (8.69 %), followed by 6 to 10 years of age group (4.76 %).

Presence of severe dengue, coagulopathy, refractory shock and acute respiratory distress syndrome were the risk factors for mortality. Case fatality rate of SEAR countries in 2006 was <1%. India, Indonesia, Bhutan and Nepal still have case fatality rates >1% (Dengue/DHF, 2007) [18].

It is times observed that 'Severe dengue' is a fatal disease with a mortality rate of 6%. Presence of severe dengue, coagulopathy, refractory shock and acute respiratory distress syndrome were the risk factors for mortality.

CONCLUSION:

Dengue is an important cause of mortality and morbidity in Bundelkhand region. High index of suspicion, early diagnosis, monitoring of the clinical and laboratory parameters and prompt intervention may help in reducing the mortality.

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