

## Original Research Article

# Thrombocytopenia and raised hematocrit-predictor in dengue hemorrhagic fever

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## ABSTRACT

**Background:** This study evaluated the symptoms and routine laboratory investigation to arrive at a bedside diagnosis of dengue hemorrhagic fever and to predict the prognosis on the basis of clinical features and investigation.

**Methods:** This was a prospective study and included children age up to 15 years admitted in the pediatric ward over 2 years period. Dengue fever and dengue hemorrhagic fever were defined according to WHO guidelines.

**Results:** Out of 90 Dengue positive children 44 (48.8%) were of Dengue Hemorrhagic Fever. The common clinical features were fever (100%), bleeding (100%), and rash (84%). 100% children had thrombocytopenia and 36% had raised hematocrit.

**Conclusions:** Triad of fever, bleeding tendencies and rash along with thrombocytopenia and raised hematocrit can be considered as predictive marker for the early diagnosis of dengue hemorrhagic Fever before the specific test like NS1 antigen and antibodies are available.

**Keywords:** Dengue hemorrhagic fever, Hematocrit, Thrombocytopenia

## INTRODUCTION

Dengue is mosquito borne viral illness caused by Flaviviridae, genus flavivirus having 4 serotype that spread by the bite of infected Aedes mosquitoes. Epidemic of an illness compatible with dengue fever were first reported in the medical literature in 1779 and 1780 and until the 1935-45 war pandemic of Dengue fever occurred every 10-30 years. Nevertheless, recurrence of epidemic of DF at any one location was infrequent.<sup>1</sup>

With subsequent uncontrolled growth of cities, epidemics of Dengue fever associated with Dengue Hemorrhagic fever emerged as major public health problems.<sup>2</sup> Dengue virus is now the most common cause of arboviral diseases in the world. Dengue virus infection is

increasingly being recognised as one of the world's major emerging infectious diseases. The clinical picture of dengue virus infection varies from asymptomatic infection to febrile flu like illness to more severe form like Dengue Hemorrhagic fever which can lead to Dengue Shock Syndrome.

Four main characteristic manifestations of dengue illness are

- Continuous high fever lasting 2-7 days;
- Haemorrhagic tendency as shown by a positive tourniquet test, petechiae or epistaxis;
- Thrombocytopenia (platelet count  $<100 \times 10^9/l$ ); and
- Evidence of plasma leakage manifested by haemoconcentration (an increase in hematocrit 20% above average for age, sex and population).<sup>3</sup>

## METHODS

This was a hospital based observational clinical study conducted in department of paediatrics in pediatric intensive care unit and in ward of major tertiary care hospital in Dhule for the period of two years. Clinical data was collected using a structured Proforma which was including the case history, clinical findings and laboratory investigation. Diagnosis of Dengue virus infection is routinely done by demonstration of anti-Dengue Virus IgM antibodies or by NS-1 antigen in patients' serum depending upon day of illness using ELISA kits.

## RESULTS

In this study, the total numbers of Dengue positive cases were 90. Dengue Hemorrhagic fever was most common subtype i.e. 44 (48.8%) among dengue positive cases as shown in Table 1.

**Table 1: Various presentation of dengue.**

Presentation of dengue	No. of cases	%
Dengue fever (Df)	12	13.33
Dengue hemorrhagic fever (DHF)	44	48.89
Dengue shock syndrome(DSS)	34	37.78
Total	90	100

**Table 2: Common clinical presentation of DHF.**

Symptoms	%
Fever	100
Rash	84
Bleeding	100

As shown in Table 2 fever, bleeding and rash were the most common clinical features seen in Dengue Hemorrhagic Fever. Fever was present in 100% of the cases. In this study, all the patients had bleeding tendency, in the form of petechiae, purpura, ecchymoses, epistaxis, gum bleeding, malena and hematemesis. Rash was found to be the most common examination finding 37(84%) cases. Thrombocytopenia was presented in all of Dengue Hemorrhagic Fever cases. Severe thrombocytopenia i.e. <50000 platelet count seen in 35 (80%) of Dengue Hemorrhagic Fever patients as shown in Table 3.

**Table 3: Lab investigation in DHF.**

Investigation	%
Thrombocytopenia	100
Severe thrombocytopenia (<50000)	80
Increased hematocrit	36

Increased hematocrit value was seen in 16 (36%) cases of Dengue Hemorrhagic fever. Serial hematocrit values may

help in increasing or decreasing fluids, the amount to be increased or decreased depends on percentage of hemoconcentration. There was no mortality in the present study. Due to increased awareness, endemic nature of disease, better transport facilities and case management according to the WHO guide- lines. Since majority of patients presented with hemorrhagic manifestations they were recognized and treated at an early stage.

## DISCUSSION

Dengue fever is usually a benign syndrome caused by an arthropod born virus. This study reviewed the clinical features and laboratory investigation which are commonly seen and help to predict the diagnosis of Dengue Hemorrhagic Fever. Dengue Hemorrhagic Fever is an important public health problem in the childhood. Thus, Dengue Hemorrhagic Fever and Dengue Shock Syndrome are more common in the subgroup of dengue due to secondary infection and the widespread of the dengue virus. Approximately 2.5 billion people live in dengue-risk regions with about 100 million new cases each year worldwide. The cumulative dengue diseases burden has attained an unprecedented proportion in recent times with sharp increase in the size of human population at risk. Dengue disease presents highly complex pathophysiological, economic and ecologic problems.<sup>3</sup>

This study was conducted over a period of two years. In this study total of 90 dengue positive cases were presented. Out of which 44 (48.9%) were Dengue Hemorrhagic Fever. Which was most common, this was similar to Ira Shah et al, Butt N et al and Capending MR et al.<sup>4-6</sup> Fever is the commonest symptoms in many diseases. In our study 100% patients had complaint of fever with mean duration of 5 days. In WHO guidelines for DHF also mentioned majority of patients having high grade fever.<sup>1</sup> It was also observed in Ira Shah et al (100%) fever with mean duration of 7.7 days, Lee MS et al (96%).<sup>4,7</sup>

In present study, all 44 (100%) children had bleeding tendencies. Hemorrhagic manifestation also commonly seen in Lee MS et al (73%), Kabra SK et al, Butt N et al (34.6%).<sup>7,8,5</sup> Fever with bleeding tendencies can be seen in many diseases like Dengue, malaria, ITP, haemophilia, GI causes, Tuberculosis, UTI, AGN, Platelet disorder, leukemia. Rash was the significant clinical finding for differentiation of Dengue Hemorrhagic Fever mainly erythematous commonly seen on palm and soles and less on trunk and face. In our study 84% cases were presented with rash. Which was similar as Lee MS et al (53.7%) and Ira Shah et al (41%).<sup>7,4</sup> Skin rashes are not commonly seen in malaria ITP, TB, hemophilia or Gastro intestinal causes. Thus, from clinical examination patients presented with fever, bleeding tendencies and rash, we can consider for Dengue Hemorrhagic Fever on lab investigation, thrombocytopenia seen in all Dengue Hemorrhagic Fever cases; but severe thrombocytopenia

i.e. platelet count <50000 were seen in 80% cases. The hemoconcentration i.e. raised HCT seen in 36%. Ira Shah et al showed thrombocytopenia in 92.3 and raised HCT in >7.7%.<sup>4</sup> Hunter et al study showed thrombocytopenia in >70% cases.<sup>9</sup> Thrombocytopenia and increased hemoconcentration were more common in Kabra et al (84.6%), Abbasi et al (84.6%) and Cepending et al 100% thrombocytopenia and 50% raised hematocrit.<sup>8,10,6</sup> Similar observation seen in Joshi et al, in Dengue fever thrombocytopenia usually associated with normal or raised hematocrit.<sup>11</sup> Thrombocytopenia with raised or normal haemoglobin may be of great predictor value for diagnosis of Dengue fever and in addition presence of rash will be concluding factor.

## CONCLUSION

Endemicity of Dengue fever is on the rise with increases incidence among children. Due to wide spread of Dengue virus the case of secondary infection is increasing thus the cases of Dengue Hemorrhagic Fever are highest in subgroup of Dengue. Triad of fever, bleeding tendencies and rash along with thrombocytopenia and raised hematocrit can be consider as predictor marker for the early diagnosis of Dengue Hemorrhagic Fever without waiting for Dengue serology. Predictor marker of Dengue Hemorrhagic Fever can be reducing the mortality if properly treated. Also, prevention of transmission by mosquito control and maintain water sanitation is required to effectively control the epidemics.

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