

# Outbreak of Dengue in Vijayapur, North Karnataka- Retrospective Analysis of Clinical Profile and Outcome

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## ABSTRACT

**Introduction:** In many parts of the world dengue is endemic when *Aedes* mosquito populations are high. So study was planned for analysis of the clinical profile of dengue cases with an emphasis on severe dengue during an outbreak in a major tertiary referral medical college hospital in Vijayapur.

**Material and methods:** We have summarized the data from 69 hospitalized patients who were laboratory confirmed for dengue infection at Al Ameen Hospital, Vijayapur. Patients were classified as either non-severe dengue fever or severe dengue fever according to the guidelines of the WHO.

**Results:** 69 seropositive cases of dengue were included in the study. Number of males affected were marginally higher in number. 44 cases belonged to the rural areas surrounding Vijayapur city. 61 cases had non severe dengue and 8 presented with severe dengue. 3 deaths were recorded. Mortality occurred in patients with associated comorbidities and coinfection.

**Conclusion:** There is no specific treatment for dengue/ severe dengue, but early detection and access to proper medical care lowers fatality rates below 1%. Early proper fluid replacement therapy with close monitoring, supportive management and patient education shows good results. Patients with severe dengue fever show prolonged hospitalization and significant impairment of organ function.

**Keywords:** Clinical Profile; Dengue; Outbreak

## INTRODUCTION

In many parts of the tropics and subtropics, dengue is endemic usually during a season when *Aedes* mosquito populations are high, often when rainfall is optimal for breeding. These areas are, however, additionally at periodic risk for dengue outbreaks, when large numbers of people become infected during a short period.<sup>1</sup> Dengue is especially rampant in and around the Talukas of Vijayapur city. Here, dengue is endemic which turns epidemic in the monsoon and post monsoon time when it is optimal for breeding. Vijayapur is at risk for outbreaks of dengue, with large numbers of people becoming infected during a short period.

Dengue is transmitted via the mosquitoes *Aedes aegyptus* and *Aedes albopictus*. Four virus types (DENV 1, DENV 2, DENV 3, DENV 4), are the cause of Dengue. The first symptoms of dengue, common to all the different species, are nonspecific and mimic a flu-like syndrome.<sup>2</sup> Clinical presentations in dengue are widely variant and non-specific ranging from fever, malaise, headache, myalgia, jaundice, nausea, vomiting and even diarrhea to serious complications causing death. The progression from simple fever to complicated dengue can be very rapid, any patient with dengue must be assessed and treated on an urgent basis.

Our aim was the analysis of the clinical profile of dengue cases during an outbreak in a major tertiary referral medical college hospital in Vijayapur. A high degree of clinical suspicion with

minimal or delayed access to advanced laboratory parameters is important in a resource-poor setting. We aimed to highlight the clinical features that can increase the identification of dengue and severe dengue and help distinguish it from other febrile illnesses so prompt treatment can be instituted. Since a specific cure or treatment per say does not exist as of now for dengue/ severe dengue, it is important to detect dengue at an early stage if we are to lower fatality rates.<sup>2</sup>

## MATERIAL AND METHODS

A total of 206 cases presented with fever to Al Ameen Hospital from June 2016 to December 2016 and 132 patients were hospitalized. Of these, 69 hospitalized patients were included in the study after they were laboratory-confirmed to have DENV infection. The study was done at the Al Ameen Hospital, Vijayapur. Dengue fever cases were confirmed either by dengue NS1 antigen ELISA detection or the IgM/IgG capture ELISA kits from the serum samples of the suspected cases.

Clinical history, physical examination, hematological, biochemical and microbiological investigations were recorded. Severe dengue cases were classified as those who determined as laboratory-confirmed DENV infection and showed severe bleeding, severe plasma leakage or severe organ involvement as per the newer classification of dengue fever by the WHO.<sup>3</sup> Plasma leakage was identified by several criteria: 1) High or a rising hematocrit; 2) Pleural effusion or ascites; 3) Shock (tachycardia, cold and clammy extremities, capillary refill time greater than three seconds, weak or undetectable pulse, narrow pulse pressure or un-recordable blood pressure.

This study was approved by the ethics committee.

### Inclusion criteria

All patients above 18 years with fever and proved to be having dengue fever confirmed either by dengue NS1 antigen ELISA detection or the IgM/IgG capture ELISA kits were included in this study.

### Exclusion criteria

Cases who have undergone treatment before giving a blood sample.

## STATISTICAL ANALYSIS

Quantitative data are presented as the mean  $\pm$  standards

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	Non-severe dengue	Severe dengue	P
<b>Total numbers</b>	<b>N = 61</b>	<b>N = 8</b>	
Age (years)	55.7	62.9	> 0.05
Sex			
Male	28 (45.9%)	6 (75%)	> 0.05
Female	25 (40.9%)	2 (25%)	
Fever	61 (100%)	8 (100%)	> 0.05
Temperature (°C)	39.1 (39.0 ~ 39.2)	39.5 (39.1 ~ 40.0)	> 0.05
Nausea	15 (24.5%)	6 (75%)	> 0.05
Vomiting	10 (16.3%)	6 (75%)	> 0.05
Diarrhea	12 (19.6%)	6 (75%)	> 0.05
Abdominal pain	14 (22.9%)	6 (75%)	> 0.05
Petechiae	28 (45.9%)	3 (37.5%)	> 0.05
Myalgia	61 (100%)	8 (100%)	> 0.05
Shock	0	3 (37.5%)	<0.001
Altered Sensorium	0	6 (75%)	<0.001
Number of deaths	0	2 (25%)	
Days of hospitalization	8.8 (8.1 ~ 9.5)	18.6 (10.7 ~ 26.6)	<0.001

Table-1: Clinical features

	Non-severe dengue N= 61	Severe dengue N= 8
Dengue NSI	46 (75%)	8 (100%)
Dengue IgM	28 (45.9%)	3 (37.5%)
Dengue IgG	54 (88.5%)	6 (75%)

Table-2: Serology

deviation (SD) and were compared by non-pair student t test. Quantitative data are presented as the average mean estimate. The categorical variables are reported as frequencies and percentages following comparison with chi-square test. P value was calculated. Descriptive statistics for the study population characteristics and laboratory findings were performed with Microsoft Excel and SPSS Inc version 17.

## RESULTS

A total of 132 hospitalized patients presented with fever between the months of June 2016 to January 2017. Of these, 69 were positive for dengue infection. 61 were classified as dengue fever and 8 had severe dengue. Three patients with severe dengue died during hospital stay.

The mean age of the patients with severe dengue was 62.9 years. This was higher than the age of patients with non-severe dengue who presented at a mean age of 55.7 years. There is no statistical difference between the two groups ( $p > 0.05$ ). Older age groups could probably be at higher risk for severe dengue. Typical clinical symptoms included fever, nausea, vomiting, diarrhea, abdominal pain, petechiae and aches (Table 1). Among the severe cases, 3 (37.5%) developed shock while 6 (75%) showed impaired consciousness. The period of hospitalization of patients with severe dengue was significantly longer than that of patients with non-severe dengue (8.8 (8.1 ~ 9.5) vs 18.6 (10.7 ~ 26.6) days respectively.

Dengue NSI positivity was seen in all (100%) of cases of severe dengue and 75% of cases of non-severe dengue. IgM and IgG positivity was higher in non-severe dengue i.e. 45% and 88.5% respectively. (Table 2)

The laboratory parameters showed increased levels of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) were higher than the normal range in patients in dengue. (Table

1). All of the clinical parameters listed above, together with levels of the creatinine (Cr) and blood urea nitrogen (Bun), were 2–3 folds higher in severe dengue. Leukopenia and thrombocytopenia were significant findings being found more commonly in severe dengue. All 8 cases with severe dengue had thrombocytopenia. (Table 3)

## DISCUSSION

Increasing urbanization and global climate were suggested to associate with the dengue transmission. This is in accordance with the study using mathematic modeling as analysis approach which showed that the mosquito density and temperatures influence the development of this dengue epidemic in Guangzhou city<sup>4</sup>

In our study, older patients presented more commonly with severe dengue. This is in accordance with the study by Yong Ping Lin, Yasha Luo et al who found in their study that the mean age of the patients with SDF was  $62.9 \pm 27.7$  years which was higher than the age of patients with NSDF (non severe dengue fever).<sup>4</sup>

Males were more commonly affected in our study. This is in contrast to the findings by Majumdar R, Jana CK et al who found a female predominance in their study- "Clinical spectrum of dengue fever in a tertiary care center with particular reference to atypical presentation in the 2012 outbreak in Kolkata."<sup>5</sup>

Mittal, H.- Faridi, M. M. A., Arora, S.K. et al in their study on Clinicohematological Profile and Platelet Trends in Children with Dengue During 2010 Epidemic in North India; found that the clinical features included fever (100%), headache (63%), abdominal pain (71%), petechia (35.5%), rash (26.6%) and bleeding manifestations (48.8).<sup>6</sup> We had similar findings in our study. Majority of the patients admitted to our hospital showed typical but mild dengue fever. Even in the severe cases, development of severe hemorrhagic manifestation, plasma leakage or shock was rarely seen.

Impairment of consciousness has been considered important for prognostic purposes. Causes underlying this could be hepatic encephalopathy, hyponatremia or metabolic disturbances. Some studies suggested that this clinical sign may associate to the disease progression and mortality during dengue infection.

	Non-severe dengue N = 61	Severe dengue N = 8	
Leukopenia	51 (83.6%)	8 (100%)	> 0.05
Thrombocytopenia	51 (83.6%)	8 (100%)	> 0.05
HCT increasing	6 (5.0%)	2 (28.6%)	<0.001
ALT (5-40U/L)	44.2 (39.5 ~ 55.0)	122.3 (0-290.5)	<0.001
AST (5-40U/L)	68.2 (56.2 ~ 75.5)	144.5 (70.8 ~ 288.2)	<0.001
Raised Serum Cr	54 (88.5%)	6 (75)%	<0.001
Raised BUN	54 (88.5%)	6 (75)%	<0.001

**Table-3:** Laboratory values

Rigau-Perez et al reported a high proportion of impaired consciousness at presentation and during disease progression.<sup>7</sup> Leo-Thein et al emphasize the importance in recognizing this sign in potentially severe dengue.<sup>8</sup>

Claude Flamand, Camille Fritzell et al in their Epidemiological assessment of the severity of dengue epidemics in French Guiana, found fluid accumulation, aspartate aminotransferase (ASAT) counts >193 IU/L and platelet counts <75,000 cells/mm<sup>3</sup> were associated with dengue severity.<sup>9</sup> We had similar findings. Another study by Potts JA, Rothman AL found that patients with dengue had significantly lower platelet, white blood cell (WBC) and neutrophil counts, and a higher frequency of petechiae.<sup>10</sup> We found similar findings but more so in the patients with severe dengue. We consider this as an important prognostic indicator.

The limitation of this study is the small sample size restricted to admitted cases. The wider variety of non-severe dengue cases who did not undergo hospitalization were not included in this study.

## CONCLUSION

Dengue in Vijayapur arrived in June but attained maximum peak in the months of November – December. Outbreaks are a harbinger of endemic establishment of a disease. Control of the vectors of dengue is of utmost importance to prevent establishment of endemic DENV transmission. In endemic areas, early identification and treatment are important to prevent outbreaks. For this, more studies with larger subsets of population are needed.

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