



## A STUDY OF CLINICAL AND LABORATORY PROFILE OF DENGUE FEVER AT A TERTIARY CARE HOSPITAL IN KERALA

### Cardiology

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### ABSTRACT

**Introduction:** Dengue is hyperendemic in India, with the rampant spread of the infection attributed to rapid urbanization, lifestyle changes, poor hygienic practices, unauthorized dwelling, improper water storage, etc. Dengue infection presents with various symptoms and signs. The exact clinical profile is important for patient management and thus is crucial for saving lives. The present study is an attempt to describe the salient clinical and laboratory findings of serologically confirmed hospitalised cases of dengue fever during the study period.

**Methods :** Patients admitted with undifferentiated short febrile illness (<7 days duration), at medical college hospital, Alappuzha, Kerala, between June 2013 and December 2013 were included. Patients with a definite alternative diagnosis like typhoid, malaria, UTI, respiratory infection were excluded. Socio demographic and clinical details were collected using a predesigned proforma. A detailed clinical examination was performed and relevant laboratory investigations were done. Occupational history, history of contact with animals / contaminated water were elicited. IgM ELISA test for Leptospirosis and Dengue (Mac ELISA) were done for all patients on the 7th day of fever. The various symptoms, physical and laboratory findings were compared between dengue fever and other common febrile illnesses. Statistical analysis was done using SPSS-16e

**Results:** Fever was the most common presenting symptom. The various symptomatology include abdominal pain (23.9%), arthralgia (21.7%), catarrhal symptoms (19.6%), nausea (15.2%), diarrhea (10.9%), dyspnea (8.7%), cough (6.5%). The frequency of physical findings were skin rashes (87%), tachypnea (32.6%), muscle tenderness (13%), conjunctival congestion (11%), hepatomegaly (10.9%), pallor (8.7%). The altered laboratory parameters include thrombocytopenia (95.7%), elevated SGOT (80.4%), leucopenia (58.7%), elevated SGPT (69.6%), elevated ALP (67.4%), hypoalbuminemia (30.4%), anemia (19.6%), elevated creatinine (15.2%), elevated blood urea (10.9%), hyperbilirubinemia (8.7%), leukocytosis (4.3%).

**Conclusion:** Patients with dengue fever present with varying manifestations. The symptomatology overlap with those of other common febrile illness. Arthralgia, muscle tenderness, leucopenia and thrombocytopenia are significantly more common in dengue than other febrile illnesses. A high index of suspicion in at-risk population helps in early diagnosis and management.

### KEYWORDS

dengue, short febrile illness, thrombocytopenia

### Introduction

Dengue is a mosquito borne viral infection with four serotypes. All four serotypes i.e., dengue 1,2,3,4 have been isolated in India. The manifestations include dengue fever (DF), dengue haemorrhagic fever (DHF), and dengue shock syndrome (DSS). The WHO estimates that, presently about two-fifths of the world population is at risk for this viral infection [1]. About 50 million cases and 24,000 deaths tend to occur in 100 endemic countries. About 500,000 people are hospitalized with DHF annually and about 2.5 percent die. Dengue epidemics are occurring at an increased frequency and one or more serotypes circulate. Since the time Dengue was first reported in 1780, there has been several epidemics, most of them in tropical and subtropical countries. During these epidemics, infection rate among virus naïve patients ranges from 40-90 percent [2]. According to the WHO report, The estimated risk of mortality among untreated cases is about 20% and that in hospitalized patients is about 1%. [3]. Dengue viral infection is a major health problem in our country. Globally, the incidence of dengue has increased in the recent years.

The first confirmed report of dengue infection in India dates back to the 1940s, and since then more and more new states have been reporting the disease which mostly strikes in epidemic proportions often inflicting heavy morbidity and mortality [4]. In India, Dengue is hyperendemic (Category A) and is a notifiable infectious disease [5]. The case fatality rate, in 2011, was 0.65%. Kerala is one of the states with highest infection rate [6]. Sporadic occurrence of DF cases has been reported in Kerala since 1997. A large outbreak of DF occurred in 2003 in Kollam city of Kerala with significant mortality.

The extent of dengue transmission depends on interplay of multiple

factors including host population density, vector density and proportion of non-immunized people in a community. Rapid urbanization, lifestyle changes, poor hygienic practices, unauthorized dwelling, improper water storage, leads to uncontrolled mosquito breeding and rampant spread of the viral infection. The common signs and symptoms observed were fever, headache, myalgia, arthralgia, and less commonly bleeding manifestations. The exact clinical profile is important for patient management and thus is crucial for saving lives. The present study is an attempt to describe the salient clinical as well as laboratory findings of serologically confirmed hospitalised cases of dengue fever during the study period. The study group represented the adult population with short febrile illness.

### Material and Methods

The study prospectively included patients admitted with undifferentiated short febrile illness (<7 days duration), at medical college hospital, Alappuzha. The study was conducted between June 2013 and December 2013. The patients age ranged between 13 and 60 years. Patients with a definite diagnosis like typhoid, malaria, UTI, respiratory infection were excluded from the study. Socio demographic and clinical details were collected using a predesigned proforma. A detailed clinical examination was performed and relevant laboratory investigations were done. Occupational history, history of contact with animals, history of contact with contaminated water were collected. IgM ELISA test for Leptospirosis and Dengue (Mac ELISA) was done for all patients on the 7th day of fever. IgM antibody is the first immunoglobulin isotype to appear during primary dengue infection and will rise to detectable levels at around 7 days. Statistical analysis was done using SPSS-16e

## Results

A total of 150 patients were recruited for the study. Of them, 82 (54.7%) were females and 68 (45.3%) were males. The mean age of the patients was 37.65 years and the average duration of fever was 4.58 days. 63(42%) patients had agriculture and fishing as the occupation and 61(40.7%) were homemakers. 30(20%) patients had contact with animal as a part of their occupational and recreational activities and 68 (45.3%) patients had contact with dirty water. Among the 150 patients under study, 46(30.7%) had IgM Dengue antibody positive by ELISA. The diagnosis was dengue fever in 46 (30.6%), leptospirosis in 45 (30%), non-specific viral fever in 36 (24%) cases and LRTI in 9(6%) patients and other fevers included acute pyelonephritis 1(0.7%), cellulitis 1(0.7%), enteric fever 1(0.7%), meningitis 1(0.7%), pneumonia 2(1.3%), sinusitis 3(2%), UTI 1(0.7%) and viral hepatitis 2(1.3%). The baseline characteristics of patients with dengue infection is shown in Table.1. The symptomatology of dengue infection with other common febrile illnesses diagnosed in the study are compared in Table 2.

**Table : 1. Baseline characteristics of patients with dengue fever**

S. No	Baseline characteristics	No. (%) / Mean $\pm$ SD
1.	Females	28 (60.9 %)
2.	Age (yrs)	35.76 $\pm$ 14.47
3.	Fever duration (days)	4.65 $\pm$ 1.3
4.	Temperature ( $^{\circ}$ F)	99.7 $\pm$ 1.16
5.	Pulse rate	84.6 $\pm$ 12.2
6.	Systolic blood pressure (mmHg)	116.4 $\pm$ 14.7
7.	Respiratory rate	20.5 $\pm$ 5.6
8.	Hemoglobin (g%)	13.4 $\pm$ 1.7
9.	Platelet count ( $\times 10^3$ /mm <sup>3</sup> )	90.6 $\pm$ 70.5
10.	S. creatinine (mg%)	0.967 $\pm$ 0.385

**Table : 2. Comparison of symptomatology of dengue and other common febrile illnesses**

Symptoms	Dengue (46)	Other fevers (104)	Total (150)	P value
Arthralgia	10 (21.7%)	8 (7.7%)	18 (12.1%)	< 0.05
Abdominal pain	11 (23.9%)	20 (19.2%)	31 (20.8%)	> 0.05
Dyspnoea	4 (8.7%)	19 (18.2%)	23 (15.3%)	< 0.05
Catarrhal symptoms	9 (19.6%)	28 (26.9%)	37 (24.7%)	> 0.05
Cough	3 (6.5%)	22 (21.1%)	25 (16.7%)	< 0.05
Nausea	7 (15.2%)	11 (10.5%)	18 (12%)	> 0.05
Diarrhoea	5 (10.9%)	13 (12.5%)	18 (12%)	> 0.05

**Table : 3. Comparison of physical signs of dengue and other common febrile illnesses**

Physical signs	Dengue (46)	Other fevers (104)	Total (150)	P value
Muscle tenderness	6 (13%)	45 (43.2%)	51 (34%)	< 0.05
Pallor	4 (8.7%)	14 (13.4%)	18 (12%)	> 0.05
Skin rashes	40 (87%)	100(96.1%)	140(93.3%)	> 0.05
Conjunctival congestion	5 (11%)	34 (32.7%)	39 (26%)	> 0.05
Icterus	0	14 (9.3%)	14 (9.3%)	< 0.05
Hepatomegaly	5 (10.9%)	23 (22%)	28 (18.7%)	> 0.05
Tachypnoea	15 (32.6%)	26 (25%)	41 (27.3%)	>0.05

**Table : 4. Comparison of lab parameters in dengue and other common febrile illnesses**

Investigations	Dengue	Other fevers	Total	P value
Anemia	9 (19.6%)	33 (31.7%)	42 (28%)	> 0.05
Leucocytosis	2 (4.3%)	45 (43.2%)	47 (31.3%)	< 0.05
Thrombocytopenia	44 (95.7%)	48 (46%)	92 (61.3%)	< 0.05
Leucopenia	27 (58.7%)	4 (3.8%)	31 (20.7%)	< 0.05
Elevated SGOT	37 (80.4%)	74 (71.1%)	111 (74%)	> 0.05
Elevated SGPT	32 (69.6%)	63 (60.5%)	95 (63.3%)	> 0.05
Elevated ALP	31 (67.4%)	88 (84.6%)	119 (81.5%)	> 0.05
Hyperbilirubinemia	4 (8.7%)	34 (32.7%)	38 (25.3%)	< 0.05
Hypoalbuminemia	14 (30.4%)	47 (45%)	61 (40.7%)	> 0.05
Elevated blood urea	5 (10.9%)	31 (29.8%)	36 (24%)	> 0.05
Elevated creatinine	7 (15.2%)	33 (31.7%)	40 (26.7%)	> 0.05

## Discussion

Transmission of dengue increases during monsoon. The present study

was conducted during the rainy season (june to september), period that favours growth and breeding of the vector *Aedes aegypti*. Study of the clinical profile in DF is important for understanding the disease severity and to guide patient management. Clinical presentation of dengue varies from region to region, based on the circulating serotype, climatic conditions, afflicted population, comorbidities etc. Since, dengue fever mostly presents with non-specific symptoms, it may be confused with other more common febrile illnesses like viral gastroenteritis, enteric fever, etc. In this study, the patients with dengue belonged to the age group of 24-49 years. In an earlier study, maximum dengue infections occurred in the age group of 15-44 years [7]. Unlike in previous studies, the male to female ratio is reversed in our study. In previous studies, the male to female ratio was 1.8:1 [8] and 1.3:1 [9]. In our study, the male to female ratio was 1 : 1.5. The difference in ratio could be due to the difference in the population studied.

In our study, fever was the presenting symptom in all (100%) the patients with dengue. Gastrointestinal symptoms were reported by about 50% of dengue patients. About 20% of our patients had catarrhal symptoms. In a study, around 96% of patients had congested pharynx, and rhinitis was reported in 13% of the patients [10]. About 24% of our patients complained of abdominal pain. Similar proportions have been reported in other studies. [11, 12] Pain abdomen in DF is a warning sign and mandates admission and close monitoring. The various possible causes of pain abdomen in DF include stretching of liver capsule due to hepatitis, pancreatitis, acalculous cholecystitis and peptic ulcer. Higher incidence (60%) was noted in another study from Kerala [13]. Less number of patients had abdominal symptoms in another study [14]. While arthralgia was reported by 22% of patients, muscle tenderness was elicited in 13% of patients. Myalgia followed by headache, vomiting were the most frequent symptoms in another study etc.[15]

None of our patients had major bleeding manifestations while other studies have reported bleeding in 26.6% [9] and 3.84% of patients [16]. Elevated renal parameters were encountered in 15% of patients and none of the patients had encephalopathy whereas another study reported these complications in 40.6% and 0.66% patients respectively. No hemodynamic instability or mortality was observed in our study. 3 deaths due to hypotension was reported in seropositive patients[14]. Elevated bilirubin was found in about 9% of our patients. Similar findings were reported in other studies [17]. Liver enzymes like AST was raised in 80.4% and ALT in 69.6% of study population and the corresponding figures were 30% and 50% reported by other studies [15,18]. 90% of patients had elevated transaminases in a reported series of patients [19]. Transaminitis could be due to injury to hepatocytes, hypoxia, shock or associated liver disease. No case of fulminant hepatic failure was noted in our study.

Physical examination plays an important role to identify warning signs of dengue fever. Five (11%) of our patients had hepatomegaly on clinical examination, though none of them had severe dengue manifestations. Presence of hepatomegaly is an important sign that mandates in-hospital care in a patient with suspected dengue. Cutaneous manifestations are another important clue to the diagnosis of dengue fever. The various cutaneous manifestations include blanchable maculopapular rash associated with itching, usually appearing after 3-6 days. Cutaneous haemorrhagic manifestations such as petechiae and ecchymoses, positive tourniquet test may appear. In our study, an erythematous blanchable, itchy rash was observed in 87% patients. The rash was reported in 82% of cases in another study [20]. Conjunctival injection was observed in 11% of all cases. Slightly lesser frequency (2.6 to 7.3%) was observed in a previous study [21].

About 95.7% of our patients had thrombocytopenia (platelet count < 100000 cells/cumm). Thrombocytopenia was much commoner in our study compared 72.77% reported by a previous study [22]. Although thrombocytopenia was a common finding, no major bleeding occurred in our patients. Poor correlation between thrombocytopenia and bleeding tendencies were also observed previously [19]. Leukopenia was observed in 58.5% of patients compared to 30% reported previously [18] Though only 9% of the patients had clinically evident pallor, anemia was documented in about 20% of patients. Leucocytosis was found in 4% of our patients. Leucocytosis in dengue infection may indicate secondary bacterial infections. In a study, six out of nine dengue patients with leucocytosis were shown to have concurrent bacteraemia [23]

### Limitations

Limitations of the study include small sample size and NS1 antigen detection was not employed. The study was conducted over a small period and the manifestations may vary during other seasons of the year. Also, the manifestations and the severity may vary during epidemics and depending on the serotype involved.

### Conclusion

The manifestations of dengue fever vary widely depending on the population studied, climatic conditions, patient characteristics etc. This study has compared the clinical parameters of dengue fever with other febrile illnesses commonly encountered in our population. Most patients present with constitutional symptoms that significantly overlap with more common febrile illnesses. High index of suspicion in at-risk population in appropriate clinical setting might help early diagnosis of dengue fever.

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