

Original Research Article

Clinico-laboratory profile of dengue patients in a tertiary hospital of Eastern India

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ABSTRACT

Background: Dengue is the most rapidly spreading mosquito-borne viral disease of mankind. According to WHO, about 50-100 million new dengue infections are estimated to occur annually in more than 100 endemic countries. So, the present study has been done to analyze varied clinical and laboratory profile of confirmed dengue cases.

Methods: Cross-sectional observational study was undertaken among 106 adult Ig M Ab positive cases admitted during October 2015 to September 2017. All patients were evaluated clinically and subjected for relevant laboratory investigations.

Results: In our study male and female ratio was 20.2:1. Most common symptom was fever (95.3%) and least common was jaundice. Second most symptom was headache (70.8%). Myalgia was present in 49.1% of cases. 54.7% had nausea/vomiting. Hypotension was noticed in 33% of cases whereas encephalopathy and melaena was found in 6.6% and 2.83% respectively. Leucopenia was present in 57.5% and thrombocytopenia in 50.9% of cases.

Conclusions: Younger males were commonly affected with dengue fever and promptly responded to conservative therapy due to early confirmation of diagnosis. Mortality was only 1.8% cases, may be due to delay in seeking medical attention.

Keywords: Aedes aegypti, Dengue fever, Dengue hemorrhagic fever (DHF), Flavivirus, Laboratory profile

INTRODUCTION

Dengue is the most rapidly spreading mosquito-borne viral disease of mankind, with a 30 fold increase in global incidence over the last 5 decades. It is a major public health concern throughout the tropical and subtropical regions of the world.

Almost half of the world's population lives in countries where dengue is endemic. According to WHO, about 50-100 million dengue infections are estimated to occur annually in more than 100 endemic countries.¹

Dengue is the most common arthropod-borne viral (arboviral) infection in humans.² It is caused by infection with one of the 4 serotypes of dengue virus (DENV) which is a single stranded RNA virus of genus flavivirus.³ It is comprised of 4 closely related but antigenically distinct serotypes, DENV1, DENV2, DENV3 and DENV4.⁴ All 4 serotypes have been isolated in India but DENV1 and DENV3 are widespread. Infection with one dengue serotype confers lifelong homotypic immunity to that serotype and a very brief period of partial heterotypic immunity to other serotypes, but a person can be infected by all 4 serotypes.⁵ Dengue is

transmitted by mosquitoes of the genus Aedes, mainly Aedes aegypti.⁶

Initial dengue infection may be asymptomatic (50-90%).⁷ It may cause non-specific febrile illness or may produce the symptom complex of classic dengue fever. Classic dengue fever is marked by rapid onset of high fever, headache, retro-orbital pain, diffuse body pain (both muscle and bone), weakness, vomiting, sore throat, altered taste sensation and centrifugal maculopapular rash. Sometimes dengue hemorrhagic fever (DHF) can occur in a person who is infected with one serotype and previously by another serotype.²

As it involves almost all systems of the body, the clinical and laboratory profile is crucial for diagnosis as well as management of the dengue patients. There are limited number of studies regarding clinical and laboratory profile of dengue patients in this part of country. This study is an effort to elucidate the clinical and laboratory profile of serologically confirmed cases of dengue patients.

METHODS

This cross-sectional observational study was undertaken in the Department of Medicine, VSS Institute of Medical Sciences and Research, Sambalpur in Odisha state from October 2015 to September 2017. Ethical approval was obtained from the Institutional Ethical Committee (IEC) and informed consent was taken from the patients or relatives.

In this study, 106 patients of >14 years and of both sexes were enrolled. All the patients admitted to either dengue ward or medicine ward had serum NS1 (non-structural protein) antigen positive by ICT (immune chromatographic test) and/or serum IgM antibody positive by MAC (IgM antibody capture) ELISA method. Patients with pre-existing neurological deficits and concomitant malaria, typhoid and leptospirosis were excluded in the study.

Detailed history and thorough clinical examination was performed on each patient. Different relevant investigations like complete blood count (CBC), blood urea, serum creatinine, serum sodium and potassium, FBS/RBS, liver function tests, HIV, HCV, HBV, x-ray chest, ultrasonography of abdomen were done. Imaging studies like CT scan of brain was done in 2 patients, MRI of brain in 7 patients and MRI of spinal cord was done in 1 patient.

CSF study was done in 7 patients for NS1 antigen and/or IgM antibody, biochemical and cytological tests. EEG was done in 5 patients. Nerve conduction study was done in 2 patients. Other differential diagnoses were excluded by appropriate tests. Data collected were tabulated, analyzed and compared with the previous studies.

RESULTS

Out of 106 cases, 101 cases were male and 5 cases were female with male to female ratio of 20.2:1. The maximum number (70) of cases were within 15-30 years of age and minimum number (8) cases were found in the age group of >50 years. 28 cases were within 31-50 yrs. Out of 70 cases in the age group 15-30 years, 68 (64.15%) were male and 02 (1.88%) cases were female as shown in Table 1.

Table 1: Age and sex distribution.

| Age group | No. of cases | | Percentage | |
|--------------------|--------------|--------|------------|--------|
| | Male | Female | Male | Female |
| 15-30 years | 68 | 02 | 64.15 | 1.88 |
| 31-50 years | 25 | 03 | 23.58 | 2.83 |
| >50 years | 08 | 00 | 7.54 | 00 |
| Total no. of cases | 101 | 05 | 95.28 | 4.71 |

Table 2: Distribution of symptoms in study cases.

| Symptoms | No. of cases | Percentage |
|-----------------------------|--------------|------------|
| Fever | 101 | 95.3 |
| Myalgia | 52 | 49.1 |
| Headache | 75 | 70.8 |
| Nausea/vomiting | 58 | 54.7 |
| Rash | 11 | 10.4 |
| Jaundice | 10 | 9.43 |
| Arthralgia | 30 | 28.3 |
| Pruritus | 15 | 14.1 |
| Retro-orbital pain | 11 | 10.4 |
| Asthenia | 25 | 23.6 |
| Bleeding manifestations | 11 | 10.4 |
| Neurological manifestations | 13 | 12.2 |

Table 3: Pulse rate variation among study cases.

| Pulse rate (per minute) | No. of cases | Percentage |
|-------------------------|--------------|------------|
| <60 | 05 | 4.7 |
| 61-100 | 54 | 50.9 |
| >100 | 47 | 44.3 |
| Total | 106 | 100 |

Table 4: Complications of dengue fever seen among the study cases.

| Complications | No. of cases | Percentage |
|------------------|--------------|------------|
| Haematological | 11 | 10.4 |
| Neurological | 13 | 12.2 |
| Renal | 05 | 4.71 |
| Hepatic | 18 | 16.9 |
| Cardiovascular | 35 | 33.0 |
| Respiratory | 02 | 1.8 |
| Alimentary tract | 15 | 14.1 |

In our study, most common presentation was fever (95.3%) followed by headache (70.8%), nausea and

vomiting (54.7%) and myalgia (49.1%). Least common presentation was jaundice (9.4%) as shown in Table 2.

In this study, 54 (50.9%) patients were having normal heart rate, whereas 5 (4.7%) patients were having bradycardia and 47 (44.3%) were having tachycardia (Table 3).

This study shows maximum no of cases 35 (33%) having cardiovascular system involvement in the form of hypotension. Hepatobiliary system involvement in the form of hepatitis was present in 18 (16.9%) cases, out of which 13 (12.3%) cases had hepatomegaly. Alimentary tract features in the form of nausea and vomiting were present in 15 (14.1%) cases. Renal failure was present in 5 (4.7) cases. Only 2 (1.8) cases were having respiratory system involvement in the form of upper respiratory tract infection. Multi organ failure cases were not found in our study (Table 4).

Out of all cases, melaena was found in maximum number (2.83%) and epistaxis, gum bleeding, haemoptysis and haematuria were seen in 1.88% cases each (Table 5).

Table 5: Bleeding manifestations seen among the study cases.

| Symptoms | No. of cases | Percentage (%) |
|--------------|--------------|----------------|
| Gum bleeding | 02 | 1.88 |
| Epistaxis | 02 | 1.88 |
| Haemoptysis | 02 | 1.88 |
| Melaena | 03 | 2.83 |
| Haematuria | 02 | 1.88 |

Table 6: Neurological manifestations seen among the study cases.

| Clinical entity | No. of cases | Percentage |
|---|--------------|------------|
| Encephalopathy | 07 | 6.60 |
| Cerebellitis | 03 | 2.83 |
| Guillain Barre syndrome (G.B. Syndrome) | 01 | 0.94 |
| Hypokalemic paralysis | 01 | 0.94 |
| Foot drop | 01 | 0.94 |
| Total | 13 | 12.2 |

Out of 106 cases, 13 (12.2%) cases had neurological involvement. Most common diagnosis was dengue encephalopathy (6.6%), presented with altered sensorium and seizure having Glasgow Coma Scale (GCS) <13. Cerebellitis in the form of gait ataxia, nystagmus and dysarthria were seen in 3 (2.83%) patients. G.B. syndrome, hypokalemic paralysis and foot drop were found in one case each (Table 6).

Present study shows haematocrit >45% in 34(32.07%) cases. Leucopenia was found in 61 (57.54%) cases. Platelet count <20,000/mm³ and 20,000-50,000/mm³ were seen in 11 (10.4%) cases each. 18 (16.9%) cases

were having platelet count within 50,000-1 lakh/mm³. Platelet count of 1-1.5lakh/mm³ was found in 14 (13.2) cases. Out of 18 cases of hepatobiliary involvement, all cases had raised SGPT, 15 cases had raised SGOT and 10 cases had hyperbilirubinemia. Serum creatinine was raised (>1.5mg/dl) in 5 (4.71%) no of cases (Table 7).

Table 7: Laboratory parameters of dengue study cases.

| Laboratory parameters | No. of cases | Percentage |
|----------------------------------|--------------|------------|
| Haematocrit>45% | 34 | 32.07 |
| Leucopenia <4000/mm ³ | 61 | 57.54 |
| Platelet count: | | |
| <20,000/ mm ³ | 11 | 10.4 |
| 20,000-50,000/ mm ³ | 11 | 10.4 |
| 50,000-100,000/ mm ³ | 18 | 16.9 |
| 1-1.5 lakh/ mm ³ | 14 | 13.2 |
| >1.5lakh/ mm ³ | 52 | 49.1 |
| Serum Bilirubin>2mg/dl | 10 | 9.43 |
| SGOT > 45 IU/L | 15 | 14.15 |
| SGPT>45 IU/L | 18 | 16.9 |
| Serum Creatinine>1.5 mg/dl | 05 | 4.71 |

DISCUSSION

The present study was conducted among 106 cases of dengue fever admitted to Department of General Medicine at VSSIMSAR, Burla, Odisha from the month of October 2015-September 2017. The dengue patients having serum NS1 (non-structural protein) antigen positive by ICT (immune chromatographic test) and/or serum IgM antibody positive by MAC (IgM antibody capture) ELISA method were included in this study. All the cases were subjected through clinical examination, biochemical tests, imaging studies and electrodiagnostic tests whenever needed.

In this study, peak incidence of dengue fever (66.03%) was in age group 15-30 years with median age of 29 years. Only 6.6% of cases were found in older age group >50 years. This finding is similar with Nelly B et al.⁸ In their study male predominance (93.4% cases) and only 6.6% female cases were observed. This finding does not correlate with study done by Yousufetal Md, et al.⁹ This gender disparity may be due to lack of penetration and lack of health awareness among females. Most of the cases were admitted within September to November, indicating clustering of cases during this period. In our study, most common presentation was fever (95.3%) followed by headache (70.8%), nausea and vomiting (54.7%) and myalgia (49.1%). Least common presentation was jaundice (9.4%). Deshwal et al, observed fever in 100%, headache in 94.8%, nausea and vomiting in 5.4%.²

In our cases, retro-orbital pain was noticed in 11 (10.4%) cases, Nelly B et al noticed retro-orbital pain in 44.4%,

Yousuf Md et al in 20% cases and Deshwal et al in 18.25%.^{8,9,2} Rash was seen in 10.4% cases, similarly Nelly B et al noticed rash in 9.6%, whereas Deshwal et al, observed rash in 37.86%.^{8,2}

In present study, 54 (50.9%) patients were having normal heart rate, 5 (4.7%) patients were having bradycardia and 47 (44.3%) were having tachycardia. Whereas Deshwal et al, observed bradycardia in 8.3% cases and Yousuf Md, et al noticed in 11.33%.^{2,9}

This study shows maximum involvement of cardiovascular system 35 (33%) cases in the form of hypotension. Yousuf Md et al, noticed hypotension in only 7.33%.⁹ Hepatobiliary dysfunction in the form of hepatitis was present in 18 (16.9%) cases. Out of which hepatomegaly was seen in 13 (12.3%) cases. Deshwal et al, noticed hepatomegaly in 14.8%.² Alimentary tract involvement in the form of nausea and vomiting were present in 15 (14.1%) cases. Nelly B et al, observed this in 52.1%, Yousuf Md et al, observed in 23.33%, but Deshwal et al observed in only 5.4%.^{8,9,2}

Renal failure was present in 5 (4.7%) cases. Yousuf Md et al, observed in 4.66%.⁹ Only 2 cases were having respiratory system involvement in the form of upper respiratory tract infection. Similar presentation was seen in Nelly B et al, but in 17.9% cases.⁸ Multi organ failure cases were absent in our study. These findings were observed in 0.66% of cases in Yousuf Md et al, study.⁹

Out of all bleeding manifestations, melaena was found in majority cases (2.83%) and epistaxis, gum bleeding, haemoptysis and haematuria were in 1.88% cases each. In contrast to our study one study from South India shows 30% cases of bleeding manifestations.¹⁰ This disparity may be because of different aetiological serotypes.¹¹

Out of 106 cases, 13 (12.2%) cases had neurological involvement. Most common diagnosis was dengue encephalopathy (6.6%), presented with altered sensorium and seizure having score of <13 in Glasgow Coma Scale (GCS). Borawake K et al, reported a case of dengue encephalitis.¹² Dengue cerebellitis was seen in 2.83% of cases in present study. Withana M et al reported one case of dengue cerebellitis.¹³ Dengue associated G.B. syndrome was seen in 1 (0.94%) case. Soares CN et al, reported dengue associated G.B. syndrome in 4 cases.¹⁴ Dengue associated hypokalaemic paralysis was seen in 1 (0.94%) case. Hira et al, reported Dengue associated hypokalaemic paralysis in 10 cases.¹⁵

Platelet count <50000/mm³ was seen in 22 (20.8%) cases. But Deshwal et al, noticed this in 69.51% and Yousuf Md et al, observed in 63.14% of cases.^{2,9} Leucopenia (<4000/mm³) was seen in 61 (57.54%) cases. But Deshwal et al, noticed this in 20.19% and Yousuf Md et al, observed in 38.66% of cases.^{2,9} Haematocrit >45% was seen in 34 (32.07%) cases. Deshwal et al, noticed this

in 20.77% and Yousuf Md et al, observed in 23.33% cases.^{2,9}

Serum bilirubin >2mg% was seen in 10 (9.43%) cases. Yousuf Md et al, also observed similar finding (11.33% cases).⁹ Liver enzymes like SGOT was increased in 15 (14.15%) and SGPT was increased in 18 (16.9%) cases. Yousuf Md et al, observed 40.66% cases with increased SGOT and 28% cases with increased SGPT.⁹

In our study, renal failure was observed in 5 (4.71%) cases. Yousuf Md et al, also observed similar result (4.66% cases) with renal failure.⁹ All patients improved with conservative management except one case who expired few hours of hospitalization. This patient was diagnosed to have dengue encephalopathy.

CONCLUSION

Dengue cases are increasing due to rapid urbanization, lack of sanitary improvement and awareness. Dengue fever should be suspected in a febrile patient presenting with headache, retro-orbital pain, myalgia, arthralgia, maculopapular rash and pruritus. Laboratory abnormalities like leucopenia, thrombocytopenia, elevated hepatic enzymes are common findings. Early diagnosis, careful monitoring and judicious fluid management can reduce the mortality due to complications.

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