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Original Research Article

A Hospital-Based Study to Evaluate the Clinical Profile of Dengue Patients: An Observational Study

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Abstract

Aim: The aim of the present study was to study clinical spectrum of dengue patients admitted in a tertiary care hospital in Bihar.

Methods: The present study was conducted in the Department of General Medicine for the period of 1 year. A total of 200 hospitalized patients (Age >15 years) diagnosed as dengue were enrolled in our study.

Results: A total of 200 hospitalized patients (Age >15 years) diagnosed as dengue were enrolled in our study out of which 150 patients were males (75%) and 50 patients were females (25%). Mean age of presentation was 39.51 years (19-68 years). Maximum number of cases was found in age group 30-40 years (37%) followed by 23% in 41-50 years age group. Out of 200 cases with distribution in antigenic presentation, 56% patients were NS1 positive, IgM positive in 29% of cases, NS1 & IgM positive in 11% patients and IgG positive in 3% of cases which indicated secondary cases and 2 cases with all NS1, IgM, IgG for Dengue positive. In our series in clinical manifestations, all cases (100%) presented with fever, myalgia(75%), headache(50%), rashes in 15% cases others clinical features are nausea, pain abdomen(20%) loose motion(15%), puritus etc. None of our patient have visual complains. Retro-orbital pain was noted in 5 patients (5%). Bleeding manifestations in any form was seen in 40% cases. In spectrum of bleeding manifestations bleeding in skin manifestations like Purpura or Petechia predominates (26%). Gasto-intestinal bleeding like malena (21%) and hematemesis in 2% cases and other bleeding features like epixtasis in 6% cases, Gum bleeding in 3%, Hematuria in 1%, and Ophthalmic bleeding like sub conjunctival hemorrhage, intra-vitreal hemorrhage in 8% cases. The commonest organ involvement is Liver (hepatopathy) in 52% cases.

Conclusion: With the rise in incidence in dengue fever, there is necessity to understand dengue fever, now more than ever, and this study brings out the intricacies of symptomatology, platelet counts relation with bleeding, complications and antigen antibody variation with regard to dengue.

Keywords: Dengue, inpatients, NS1 Antigen, Petechia, Platelet Count

Introduction

Dengue fever is an acute febrile illness (AFI) caused by one or more dengue viruses belonging to genus Flavivirus and transmitted by Aedes aegypti mosquito. According to World Health Organization (WHO), two-fifth of the world's population is at risk from dengue disease. India is one of the seven identified countries in South-East region regularly reporting dengue fever (DF) outbreaks, and all four serotypes are known to be circulating either singly or in combination. [1]

According to World Health Organization (WHO), the disease can be classified into group A, group B, and group C, where group C is the most severe form of the disease. [2] The mechanism that leads to the severe manifestation of DENV infections are multifocal, involving viral virulence factors and detrimental host response, resulting in abnormal hemostasis and increased vascular permeability. Secondary infection or multiple infections with different serotypes enhance the chances of more severe forms of diseases, such as dengue shock syndrome. [3] It was evident that the most frequent combination was DENV-2 and DENV-3, followed by DENV-1 and DENV-3. A combination of DENV-1, DENV-2, and DENV-3 was also identified. The higher prevalence of more severe cases may be due to secondary infection by serotype DENV-3 in 2018 and 2019. [4]

DENV has four different serotypes (DENV-1 to 4). A peculiarity of DENV infection is that infection by

one serotype produces serotype-specific lifelong immunity; however, contrary to giving protection or remaining neutral against other serotypes, a secondary infection by a heterogeneous serotype often results in severe disease by a mechanism called antibody dependent enhancement (ADE). [5] Each epidemic cycle changes the predominant serotype/genotype, often coinciding with severe disease and heightened transmission. [6] Clinically, dengue spans a spectrum from asymptomatic infection to severe manifestations, with an untreated mortality rate of 20%. [7]

Lifelong immunity to the homotypic serotype follows a primary DENV infection, but heterotypic infections may lead to increased disease severity due to pre-existing immune memory from the primary infection.[8] The clinical manifestations of dengue are well documented, encompassing a range from benign dengue fever (DF) to severe forms affecting multiple organs, including the liver, muscles, kidneys, heart, and nervous system. Uncommon clinical presentations, such as encephalopathy, encephalitis, fulminant hepatitis, splenomegaly, and ocular complications, have also been reported. [8]

The aim of the present study was to study clinical spectrum of dengue patients admitted in a tertiary care hospital in Bihar.

Methods

The present study was conducted in the Department of General Medicine, IGIMS, Patna, Bihar, India for the period of 1 year. A total of 200 hospitalized patients (Age >15 years) diagnosed as dengue were enrolled in our study.

Inclusion Criteria

Patients of more than 15 years of age who had fever and were found to be positive for NS1 antigen (Micro ELISA, J. Mitra) and dengue IgM (antibody) with or without IgG positive for Dengue were included in study.

Exclusion Criteria

Any patient with concomitant existing bleeding disorders, hemoglobinopathies, and infections like malaria, scrub typhus, enteric fever, tuberculosis and other viral illness were excluded from our study.

Total of 200 patients (age>15years) were enrolled during the outbreak of disease. A detail clinical history, systemic examination routine hematological examination i.e. hemoglobin (Hb), total leukocyte count(TLC),platelet count(PC), Liver Function Test(LFT), Renal Function Test(Serum Urea, Creatinine),Fasting Blood Sugar(FBS), PT, INR, Stool for Ocult Blood, Urine Routine and Microscopy, malarial antigen Test(MP ICT), slide test for malaria parasite, IgM antibodies for typhoid and Widal test for typhoid ,Chest X ray PA View , Ultrasonography of Abdomen and Pelvis was performed. Patients who were suffering from diabetes, hypertension and other correlated disease were excluded from our study. All subjects were classified according to WHO guidelines. Thrombocytopenia was taken as platelet count less than 1 lakh/mm3 and leukopenia as white blood cells (WBC) <5000 cells/mm3.

Data were entered and analyzed in SPSS version 12 statistical software.

Results

Table 1: Distribution of age and gender

Age in years	**N**	**%**
<20	14	7
21-30	36	18
31-40	74	37
41-50	46	23
51-60	18	9
>60	12	6
Gender		
Male	150	75
Female	50	25

A total of 200 hospitalised patients (Age >15 years) diagnosed as dengue were enrolled in our study out of which 150 patients were males (75%) and 50 patients were females (25%). Mean age of presentation was 39.51 years (19-68 years). Maximum number of cases was found in age group 30-40 years (37%) followed by 23% in 41-50 years age group.

Table 2: Antigenic/ Antibody presentations of dengue cases

Antigen/ Antibody detected	N
NS1 Antigen	112
IgM Antibody	58
NS1 Antigen +IgM Antibody	22
IgM Antibody+IgG Antibody	6
NS1 Antigen +IgM Antibody+IgG antibody	2

Out of 200 cases with distribution in antigenic presentation, 56% patients were NS1 positive, IgM positive in 29% of cases, NS1 & IgM positive in 11% patients, IgM and IgG positive in 3% of cases which indicated secondary cases and 2 cases with all NS1, IgM, IgG for Dengue positive.

Table 3: Clinical manifestations

Clinical manifestations	N (%)
Fever	200 (100)
Myalgia and backache	150 (75)
Headache	100 (50)
Loose Motion	30 (15)
Abdominal Pain	40 (20)
Retro orbital pain	10 (5)
Rashes	30 (15)
Bleeding manifestation	80 (40)

In our series in clinical manifestations, all cases (100%) presented with fever, myalgia (75%), headache (50%), rashes in 15% cases others clinical features are nausea, pain abdomen (20%) loose motion (15%), puritus etc. None of our patient have visual complains. Retro-orbital pain was noted in 5 patients (5%). Bleeding manifestations in any form was seen in 40% cases.

Table 4: Spectrum of bleeding manifestation

Spectrum of bleeding manifestation	N (%)
Purpura /Petechia	52 (26)
Malena	42 (21)
Hematemesis	4 (2)
Epistaxis	12 (6)
Hematuria	2 (1)
Gum Bleeding	6 (3)
Ophthalmic bleed	16 (8)

In spectrum of bleeding manifestations bleeding in skin manifestations like Purpura or Petechia predominates (26%). Gasto-intestinal bleeding like malena (21%) and hematemesis in 2% cases and other bleeding features like epixtasis in 6% cases, Gum bleeding in 3%, Hematuria in 1%, and Ophthalmic bleeding like sub conjunctival hemorrhage, intra-vitreal hemorrhage in 8% cases.

Table 5: Complications

Complications	N (%)
Hepatopathy	104 (52)
Nephropathy	12 (6)
Ascites	20 (10)
Pneumonia	14 (7)
DSS	10 (5)
MODS	8 (4)
DHF	28 (14)
EDS	4 (2)

The commonest organ involvement is Liver (hepatopathy) in 52% cases. Other complications like nephropathy in 6% cases, ascites 10%, pneumonia in 7%. Dengue shock syndrome (DSS) in 5%, Multiorgan Dysfunction (MODS) in 4%, Dengue Hemorrhagic fever in 14% and Extended Dengue Syndrome in 2% cases were observed.

Table 6: Correlation of bleeding to platelet count

TPC	N	Cases with bleeding manifestation
<25000	50	36
>25000-50000	60	24
>50000- 100000	44	12
>100000-150000	40	8
>150000	6	0
Total	200	80

Out of 200 cases, 80 cases were having any form of bleeding manifestation. Correlation to bleeding manifestation was done according to platelet count and observed that lower the platelet count more no of patients were having bleeding manifestation. It was observed that 36 Patients with less than 25000 platelets, 24 patients with platelet count 25000-50000, 12 of patient with platelet count 50000-100000, 8 of patients with platelet count 100000 to 150000 and no patients with platelet count more than 150000 were found to be having any bleeding manifestations.

Discussion

Dengue is emerging as a serious public health problem globally, 50 million dengue infections occurring annually. The expanding geographical distribution of both the virus and the mosquito vector is leading to increased frequency of epidemics, and the emergence of DHF in new areas may be due to climatic changes and the failure to control the mosquito vector. [9,10]

The natural history of dengue fever has three phases: febrile phase (3–7 days), a defervescence phase when complications are seen, and the spontaneous recovery phase. As per the WHO dengue classification, patients are now classified as having either dengue or severe dengue. Patients having any of the following conditions are designated as having severe dengue: plasma leakage resulting in shock, accumulation of serosal fluid to cause pulmonary oedema, severe bleeding; and severe organ impairment. [11-13]

A total of 200 hospitalized patients (Age >15 years) diagnosed as dengue were enrolled in our study out of which 150 patients were males (75%) and 50 patients were females (25%). Mean age of presentation was 39.51 years (19-68 years). Maximum number of cases was found in age group 30-40 years (37%) followed by 23% in 41-50 years age group. Dengue affects humans of all age groups. In our series the mean age of presentation is 34 years which is similar to other studies with a male preponderance which is a common observation. [14-16] Out of 200 cases with distribution in antigenic presentation, 56% patients were NS1 positive, IgM positive in 29% of cases, NS1 & IgM positive in 11% patients, IgM and IgG positive in 3% of cases which indicated secondary cases and 2 cases with all NS1, IgM, IgG for Dengue positive. Mehta et al, found NS1 antigen was positive in 88% of cases, dengue IgM antibodies in 21% of cases, and IgG in 20% of cases also by Chakravarti and Kumaria's study in Delhi where 57.36% were confirmed as serologically positive, out of which 22.28% cases were positive for dengue-specific IgM antibodies indicating primary infection, and IgG antibodies alone were also detected in 35.05% cases. [17,18]

In our series in clinical manifestations, all cases (100%) presented with fever, myalgia (75%), headache (50%), rashes in 15% cases others clinical features are nausea, pain abdomen (20%) loose motion (15%), puritus etc. None of our patient have visual complains. Retro-orbital pain was noted in 5 patients (5%). Bleeding manifestations in any form was seen in 40% cases. In spectrum of bleeding manifestations bleeding in skin manifestations like Purpura or Petechia predominates (26%). Gasto-intestinal bleeding like malena (21%) and hematemesis in 2% cases and other bleeding features like epixtasis in 6% cases, Gum bleeding in 3%, Hematuria in 1%, and Ophthalmic bleeding like sub conjunctival hemorrhage, intra-vitreal hemorrhage in 8% cases. Sreenivas et al, found that 26% of cases had melaena, 20% had petechiae, 8% had haematemesis, 4% had epistaxis and 2% had gum bleeding. [19] Various types of complications were seen during course of disease. These were hepatopathy, acute renal failure (nephropathy), ascites, Pneumonia, dengue hemorrhagic fever (DHF), Dengue complicated with shock (DSS), multi-organ dysfunction syndrome and extended dengue syndrome. Hepatopathy was the most common seen in cases 50% patients. This was mostly witnessed as jaundice and/or transaminitis. It has been reported by Ashwin Kumar that pleural effusion was their most common complication. [20]

The commonest organ involvement is Liver (hepatopathy) in 52% cases. Other complications like nephropathy in 6% cases, ascites 10%, pneumonia in 7%. Dengue shock syndrome (DSS) in 5%, Multiorgan Dysfunction (MODS) in 4%, Dengue Hemorrhagic fever in 14% and Extended Dengue Syndrome in 2% cases were observed. Out of 200 cases, 80 cases were having any form of bleeding manifestation. Correlation to bleeding manifestation was done according to platelet count and observed that lower the platelet count more no of patients were having bleeding manifestation. It was observed that 36 Patients with less than 25000

platelets, 24 patients with platelet count 25000-50000, 12 of patient with platelet count 50000-100000, 8 of patients with platelet count 100000 to 150000 and no patients with platelet count more than 150000 were found to be having any bleeding manifestations. It was observed that 95.8% of patients with platelet counts between 20,000-50,000/cu.mm developed hemorrhage according to Sreenivasa et al [20], while Joshi et al [21], Sunil Gomber et al [22] and Dhooria et al [23] reported poor correlation between thrombocytopenia and bleeding manifestations.

Conclusion

With the rise in incidence in dengue fever, there is necessity to understand dengue fever, now more than ever, and this study brings out the intricacies of symptomatology, platelet counts relation with bleeding, complications and antigen antibody variation with regard to dengue. NS1 antigen is most commonly detected and while the pathophysiology of dengue is yet to be clearly understood, bleeding manifestations relate to platelet count, which should aid in diagnosis and treatment. Considering the spread of the disease and its complications, it is recommended that special preventive strategies should be planned during the monsoon period. More attention should be given to patients with comorbid conditions. Early recognition, precise assessment with WHO revised classification, and appropriate treatment have reduced the mortality.

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