

A Hospital-Based Evaluation of the Clinical Spectrum of Dengue Patients Admitted in Tertiary Care Facility

Umesh Rajak¹, P. K. Agrawal²

¹Senior Resident, Department of Medicine, Katihar Medical College and Hospital, Katihar, Bihar India

²Professor and HOD, Department of Medicine, Katihar Medical College and Hospital, Katihar, Bihar India

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Corresponding Author: Dr. Umesh Rajak

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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 Medicine, Katihar Medical College and Hospital, Katihar, Bihar, India, undertook this one-year research. Our research included 100 dengue-diagnosed hospitalized patients (age >15 years).

Results: Mean presentation age was 38.52 (18-65). The 30-40 age group had the most instances. The average presentation duration was 7 days (4-14). Patient is mostly poor. From 100 cases with antigenic presentation, 55% were NS1 positive, 30% were IgM positive, 10% were NS1 & IgM positive, 3% were IgM and IgG positive, indicating secondary infections, and 2 were all Dengue positive.

Conclusion: With dengue fever on the increase, it's important to understand its symptomatology, platelet counts and bleeding, complications, and antigen antibody variance. This research does so.

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

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Introduction

Dengue, sometimes referred to as "bone breaking fever," is a highly transmissible disease transmitted by the bite of a mosquito species known as *Aedes aegypti*. This bug, known as the Aedes mosquito, is a carrier of any of the four dengue viruses. It is prevalent in tropical and subtropical regions around the globe. Dengue fever (DF) is characterized by symptoms including fever, headache, myalgia, arthralgia, rash, nausea, and emesis. It may lead to the occurrence of "classical" DF, dengue hemorrhagic fever (DHF) without shock, and DHF with shock. [1]

In recent years, Dengue Fever (DF), together with its more severe manifestations, Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS), has emerged as a serious public health concern. [2] Presently, a staggering 2.5 billion persons, including about 40% of the worldwide population, are at risk of acquiring dengue. The World Health Organization (WHO) estimates that there are potentially 50-100 million cases of dengue infections happening worldwide every year. [3] The problem of dengue is of particular concern in South East Asia, where it is very prevalent. [1] The sickness is prevalent across India, impacting the

majority of large cities and towns, with outbreaks also happening in rural areas of the nation. [3] While the majority of infections cure spontaneously, a small subset of patients encounter serious repercussions that need specialist medical attention. These complications, such as organ failure, usually occur at the advanced stages of the illness. This provides an opportunity to identify the particular demographic that is susceptible to developing these issues. Nevertheless, the absence of discernible symptoms presents a difficulty in identifying patients who need immediate medical attention.

The first reported occurrence of a dengue-like illness in India was described in Madras in 1780. The first documented occurrence of Dengue fever (DF) in India, substantiated by virological proof, occurred in Calcutta and along the Eastern Coast of India from 1963 to 1964. [4] Since the mid-1990s, there has been an increase in the frequency of dengue epidemics in India, particularly in urban areas. The spread of these illnesses has quickly expanded to neighboring areas, including as Arunachal Pradesh, Mizoram, and Odisha. [5] Dengue was widespread in a few select states in the southern and northern regions throughout the early 2000s. Nevertheless, it

has since expanded its influence to several other states and union territories. In addition, it has expanded its coverage from urban regions to rural ones. [6] Dengue is transmitted by the bite of a female mosquito. The main carriers of illnesses in India are the *Aedes* mosquito species, particularly *Aedes aegypti* and *Aedes albopictus*. [7] Transmission often occurs during the rainy season. The cause of dengue viral infections includes the replication of the virus, particularly in macrophages, as well as the immunological and chemical-mediated processes that occur when the host comes into contact with the virus. [8] The progression of the illness is impacted by the humoral, cellular, and innate immunity of the host. Dengue is characterized by the abrupt onset of a two-phase, high-grade fever that persists for a duration of 3 to 7 days. This fever is accompanied by symptoms such as exhaustion, nausea, coughing, headache (especially located behind the eyes), muscle and joint pain, as well as stomach discomfort. [9,10] Approximately 50% to 82% of individuals diagnosed with DF encounter a discernible skin rash. [11,12] There is no association between a large amount of virus in the body and a severe clinical manifestation throughout the duration of the illness. [8] The diagnosis of dengue infection relies on clinical findings, but it is confirmed via laboratory testing. The primary microbiological procedures include viral isolation in cell cultures, nucleic acid amplification by polymerase chain reaction (PCR), and serological identification of viral antigens (such as NS1) or particular antibodies.

The aim of this research was to investigate the spectrum of clinical symptoms noticed in dengue patients who were admitted to a tertiary care hospital in Bihar.

Methods

The present study was conducted in the Department of Medicine, Katihar Medical College and Hospital, Katihar, Bihar India for the period of one year. A total of 100 hospitalized patients (Age >15 years) diagnosed as dengue were enrolled in our study out

of which 70 patients were males (70%) and 30 patients were females (30%).

Inclusion Criteria

Included in the research were 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) either with or without IgG positive.

Exclusion Criteria

Our investigation excluded any patient with simultaneous existing bleeding disorders, hemoglobinopathies, infections such as malaria, scrub typhus, enteric fever, TB and other viral disease.

Methodology

A total of 100 patients, all aged over 15 years, were recruited during the illness epidemic. A comprehensive clinical history was taken, followed by a systemic examination. Routine hematological examinations were conducted, including measurements of 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 occult blood, urine routine and microscopy, malarial antigen test (MP ICT), slide test for malaria parasite, IgM antibodies for typhoid, and Widal test for typhoid. Additionally, a chest X-ray with PA view and ultrasonography of the abdomen and pelvis were performed. Our research excluded patients with diabetes, hypertension, and other associated conditions. The classification of all participants was done in accordance with the recommendations provided by the World Health Organization (WHO). Thrombocytopenia was defined as a platelet count below 100,000/mm³, whereas leukopenia was defined as a white blood cell count (WBC) below 5,000 cells/mm³.

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

Results

Table 1: Distribution of age

Age at presentation	N	%
15-20	5	5
20-30	20	20
30-40	35	35
40-50	25	25
50-60	8	8
>60	7	7

Our research included 100 dengue-diagnosed hospitalized patients (age >15 years), 70 of whom were male and 30 females. Mean presentation age was 38.52 (18-65). The 30-40 age group had the most instances. The average presentation duration was 7 days (4-14). Median hospital stay was 7 days. Patient is mostly poor.

Table 2: Antigenic/ Antibody presentations of dengue cases

Antigen/ Antibody detected	N
NS1 Antigen	55
IgM Antibody	30
NS1 Antigen +IgM Antibody	10
IgM Antibody + IgG Antibody	3
NS1 Antigen +IgM Antibody + IgG antibody	2

Among 100 cases with antigenic presentation distribution, 55% of patients tested positive for NS1, 30% tested positive for IgM, 10% tested positive for both NS1 and IgM, and 3% tested positive for both

IgM and IgG, indicating secondary cases. Additionally, there were 2 instances where all NS1, IgM, and IgG tests were positive for Dengue.

Table 3: Clinical manifestations

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

All patients (100%) in our clinical symptom’s series exhibited fever, myalgia (75%), headache (50%), rashes in 15% of cases. Other clinical characteristics included nausea, abdominal discomfort (20%),

diarrhea (15%), and pruritus. None of our patients have reported any visual complaints. Five individuals (5%) had retro-orbital discomfort. 40% of patients had bleeding symptoms in some manner.

Table 4: Spectrum of bleeding manifestation

Spectrum of bleeding manifestation	N (%)
Purpura /Petechia	25 (25)
Malena	20 (20)
Hematemesis	2 (2)
Epistaxis	5 (5)
Hematuria	1 (1)
Gum Bleeding	3 (3)
Ophthalmic bleed	7 (7)

Skin bleeding like Purpura or Petechia accounts for 25% of bleeding symptoms. Gastro-intestinal bleeding such melena (20%) and hematemesis (2%), epistaxis (5%), gum bleeding (3%), hematuria (1%), and sub-conjunctival and intra-vitreous hemorrhage (7%).

Table 5: Complications

Complications	N (%)
Hepatopathy	50 (50)
Nephropathy	5 (5)
Ascites	10 (10)
Pneumonia	8 (8)
DSS	5 (5)
MODS	4 (4)
DHF	15 (15)
EDS	3 (3)

Most complications and organ involvements include liver (hepatopathy) in 50% of patients. Other problems include 5% nephropathy, 10% ascites, and 8% pneumonia. Dengue shock syndrome (DSS) was 5%, MODS 4%, DHF 15%, and Extended Dengue Syndrome 3%.

Table 6: Correlation of bleeding to platelet count

TPC	N	Cases with bleeding manifestation
<25000	25	18
>25000-50000	30	12
>50000- 100000	22	6
>100000-150000	20	4
>150000	3	0
Total	100	40

Forty of 100 instances had bleeding. Platelet count affected bleeding manifestation, with lower platelet counts having more patients bleeding. It was found that 18 patients with less than 25000 platelets, 12 with 25000-50000, 6 with 50000-100000, 4 with 100000-150000, and no with 150000+ had bleeding manifestations.

Discussion

Dengue is becoming as a substantial worldwide public health concern, with a yearly incidence of 50 million cases of dengue fever. The virus and mosquito vector are expanding their range, leading to a higher occurrence of outbreaks. The emergence of DHF in these regions may be related to climatic variations and the failure to manage the mosquito vector. [13,14]

Dengue fever has a natural course that includes three different stages: the febrile period, which lasts for 3-7 days, the defervescence phase, during which complications may occur, and the spontaneous healing phase. Based on the WHO's dengue categorization, persons are now classified as either having dengue or severe dengue. Patients who have plasma leakage resulting in shock, accumulation of serosal fluid producing pulmonary edema, excessive bleeding, or notable organ failure are categorized as having severe dengue. [15-17]

Dengue affects persons of all age groups. The mean age of presentation in our collection is 34 years, which corresponds with the results of another study. It is important to mention that there is a greater percentage of males, which is an often-seen pattern. [18-20] In our study, 55% of the patients were found to have tested positive for NS1, whereas 30% showed positive findings for IgM in connection to Dengue. 10% of the patients had positive results for both NS1 and IgM, confirming the presence of the virus. In 3% of instances, there was simultaneous positivity for both IgM and IgG, indicating the presence of secondary infections. In addition, 2% of the studied patients had positive results for all three markers (NS1, IgM, and IgG), which confirms the existence of Dengue. Mehta et al. observed that the NS1 antigen yielded positive results in 88% of cases, while dengue IgM antibodies were detected in 21%

of cases and IgG antibodies in 20% of cases. In research conducted in Delhi by Chakravarti and Kumaria, it was found that 57.36% of the cases were verified to be serologically positive. Out of these patients, 22.28% tested positive for dengue-specific IgM antibodies, which suggests that they had a primary infection. In addition, IgG antibodies were found only in 35.05% of patients. [21,22] The symptoms seen were gastrointestinal (GI) in nature, including diarrhea (15%) and abdominal pain (20%). Fifteen patients (15%) had a rash, mostly of the maculo-papular kind, over their limbs and trunk. The rash was seldom accompanied by itching. Gupta et al. reported similar results, with a 100% incidence of fever among all subjects, but a higher prevalence of rash (36%) and retro-orbital pain (40%).¹³ In contrast, Ashwin Kumar noted a presentation rate of 98% along with fever, a similar incidence of rash (19.1%), but a lower incidence of headache.⁸

Of the whole patient population, 40% had bleeding symptoms to some extent. 25% of the patients had purpura and petechiae, which are characteristic signs of dengue. However, Melena was identified in 20% of the cases. The individual is experiencing bleeding from other sites, including Epistaxis at a frequency of 5%, gum bleeding at a frequency of 3%, and ocular hemorrhage. Only a limited percentage of cases had bleeding resembling subconjunctival hemorrhage. Sreenivas et al. found that 26% of the patients had melaena, 20% had petechiae, 8% experienced hematemesis, 4% had epistaxis, and 2% suffered from gum bleeding in their research. [23] Various types of repercussions were noted during the course of the sickness. The observed conditions were hepatopathy, acute renal failure (nephropathy), ascites, pneumonia, dengue hemorrhagic fever (DHF), dengue complicated by shock (DSS), multi-organ dysfunction syndrome, and persistent dengue syndrome. Hepatopathy was the most common disease found in 50% of the patients. Primarily, this was noted as jaundice and/or transaminitis. Ashwin Kumar has noted that pleural effusion was the most common outcome. [24]

Regarding platelet counts, patients with ongoing bleeding underwent a total platelet count (TPC) at least twice daily. Initially, the hematocrit levels were

typically low, but patients with DHF or DSS had high hematocrit values. However, decreased levels of hematocrit may be associated with Iron deficiency anemia and malaria, both of which are quite common in this particular area of India. Out of all the patients, 39% encountered bleeding. However, among patients with a platelet count below 25000, 61% exhibited indications of bleeding. Individuals with platelet counts over 150,000 did not show any incidences of hemorrhaging. According to Sreenivasa et al., it was shown that 95.8% of patients with platelet counts between 20,000 and 50,000/cu.mm had bleeding. Joshi et al, Sunil Gomber et al, and Dhooria et al, discovered a tenuous correlation between thrombocytopenia and bleeding symptoms. [23,25-27]

Conclusion

Dengue fever is becoming increasingly common, making it crucial to understand it. Dengue fever symptoms, platelet counts and bleeding, sequelae, and antigen-antibody reaction are examined in this research. The NS1 antigen is often seen in dengue. Dengue's pathogenesis is unknown, however platelet count may help diagnose and manage bleeding problems. We recommend developing monsoon-season prevention strategies due to the disease's prevalence and accompanying issues. People with many medical conditions should be prioritized. Early detection, correct assessment using WHO's new category, and appropriate treatment have reduced mortality.

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