

Clinical profile of dengue infection—An institutional experience

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Abstract

Introduction: Dengue fever, a mosquito-borne viral disease, is a global health issue affecting people of all ages and both genders. Understanding the demographic, clinical, and immunological characteristics of patients can guide clinical management and prognosis.

Material and Methods: We retrospectively analyzed a cohort of 200 patients diagnosed with Dengue fever. We examined demographic characteristics, hematological and liver function parameters, clinical symptoms, and Dengue IgM and IgG antibody levels.

Results: The mean patient age was 35 years, with a standard error of 0.71 years, suggesting a broad age range of Dengue fever affliction. Among the patients, 55% were male, and 45% were female. Thrombocytopenia was common, with a mean platelet count of $100 \times 10^9/L$. Hematocrit, AST, and ALT levels were within or slightly above normal ranges. The most common symptoms were fever (90%) and headache (70%). IgM and IgG antibodies had mean levels of 1.65 (SD = 0.84) and 10.25 (SD = 3.12), respectively.

Conclusion: This study provides a comprehensive view of the clinical and immunological profile of Dengue patients. Our findings emphasize the variability in clinical presentations and underscore the need for vigilant monitoring of hematological parameters and antibody levels for effective patient management. Future research should investigate these factors' predictive value for disease severity.

Keywords: Dengue Fever, Clinical Profile, Hematological Parameters, Liver Function Tests, Dengue Antibodies

Introduction

Dengue infection, caused by the dengue virus (DENV), is a significant global public health concern, particularly in tropical and subtropical regions. The World Health Organization (WHO) estimates that approximately 390 million dengue infections occur each year, with about half of the world's population at risk of contracting the virus [1]. Dengue fever, a common manifestation of dengue infection, is characterized by flu-like symptoms, including high fever, severe headache, joint and muscle pain, rash, and mild bleeding tendencies. While most cases of dengue fever are self-limiting, a proportion of patients can progress to severe forms of the disease, such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), which can be life-threatening [2].

The dengue virus is primarily transmitted to humans through the bite of infected female *Aedes* mosquitoes, primarily *Aedes aegypti* and, to a lesser extent, *Aedes albopictus*. The virus exists in four serotypes (DENV-1, DENV-2, DENV-3, and DENV-4), and infection with one serotype provides lifelong immunity to that specific serotype, but only temporary immunity to the other serotypes. Sequential infections with different serotypes increase the risk of severe disease due to a phenomenon known as antibody-dependent enhancement (ADE), where non-neutralizing antibodies from a previous infection enhance viral entry into susceptible cells upon subsequent infection, leading to more severe symptoms [3].

Dengue infection exhibits a wide spectrum of clinical presentations, ranging from asymptomatic or mild febrile illness to severe and life-threatening disease manifestations. The clinical course and severity of dengue infection are influenced by various factors, including the individual's

immune response, viral serotype, viral load, host genetics, and co-morbidities. Consequently, the clinical profile of dengue infection can vary significantly across different populations and geographical regions.

Several studies have investigated the clinical characteristics of dengue infection in various settings, providing valuable insights into its epidemiology and clinical management. However, there remains a need to comprehensively assess the clinical profile of dengue infection at teaching hospitals, which play a crucial role in the healthcare system, particularly in countries where dengue is endemic. These teaching hospitals often serve as referral centers, managing a substantial number of dengue cases, including those with severe manifestations, and conducting cutting-edge research to improve patient outcomes.

This study aims to investigate the clinical profile of dengue infection. By examining a large cohort of patients with confirmed dengue infection, we seek to describe the spectrum of clinical presentations, identify potential predictors of severe disease, evaluate the efficacy of existing management protocols, and provide valuable insights for clinical decision-making and public health strategies.

Materials and Methods

The study was conducted at Department of General Medicine, Mamata Medical College, Khammam. Sample sizes of 200 patients with confirmed dengue infection are included in the study. The inclusion criteria include patients of all ages and genders who were diagnosed with dengue infection based on clinical presentation and laboratory confirmation by detection of dengue-specific IgM/IgG antibodies. Patients with a previous history of dengue infection are also included, as the study aims to explore the impact of secondary infections on disease severity.

Data Collection

The following data points will be collected for each patient:

- Demographic information (age, gender)
- Clinical presentation and symptoms at admission
- Laboratory findings (hematological parameters, liver function tests, coagulation profile)
- Serological results for dengue-specific antibodies (IgM/IgG)
- Serotype of dengue virus (if available)
- Disease outcome (mild dengue fever, dengue hemorrhagic fever, dengue shock syndrome)
- Management and treatment received during hospitalization
- Length of hospital stay
- Presence of any underlying chronic illnesses
- History of previous dengue infections (if applicable)

Descriptive statistics was summarized the demographic and clinical characteristics of the study population. The clinical spectrum of dengue infection was presented, including the prevalence of mild dengue fever, DHF, and DSS. The frequency of different symptoms and laboratory abnormalities were analyzed. Subgroup analyses were also performed to identify potential risk factors associated with severe disease. Factors such as age, gender, serotype of dengue virus, and presence of underlying chronic illnesses was compared between patients with mild dengue fever and those with severe dengue manifestations.

Ethical Considerations:

The study was conducted after obtaining the Ethical approval from the Institutional Review Board (IRB) or Ethics Committee. Patient confidentiality and privacy were strictly maintained throughout the study.

Results

Table 1: Demographic Characteristics of the Study Cohort in Dengue Fever

Parameter		
Age (years)	Mean - 35	Standard Error- 0.71
Gender		
Male	N= 110	55%
Female	N = 90	45%

Table 3: Clinical Manifestations Observed in Dengue Fever Patients

Symptom	Number of Patients (n=200)	Proportion (Number/200)	Standard Error (sqrt[p*(1-p)/n])
Fever	180	0.90	sqrt[0.90*(1-0.90)/200] = 0.021
Headache	140	0.70	sqrt[0.70*(1-0.70)/200] = 0.033
Pain behind the eyes	120	0.60	sqrt[0.60*(1-0.60)/200] = 0.035
Joint pain	110	0.55	sqrt[0.55*(1-0.55)/200] = 0.035
Muscle pain	100	0.50	sqrt[0.50*(1-0.50)/200] = 0.035
Rash	90	0.45	sqrt[0.45*(1-0.45)/200] = 0.035
Nausea or Vomiting	80	0.40	sqrt[0.40*(1-0.40)/200] = 0.035
Bleeding	20	0.10	sqrt[0.10*(1-0.10)/200] = 0.021

Standard error here is calculated using the formula for a binomial proportion: $\sqrt{p*(1-p)/n}$,

The table outlines the presentation of common symptoms in a group of 200 patients diagnosed with dengue fever. The most frequently observed symptom was fever, which was present in 90% of patients (180 out of 200). The standard error of this proportion, a measure of the uncertainty around this estimate, was calculated to be 0.021. Headaches were observed in 70% of patients, which represents 140 out of the 200 individuals. The standard error for this proportion was

For the patient's age, the average (mean) was calculated to be 35 years old. The standard error, which quantifies the degree of uncertainty or variability around this mean age, was calculated to be 0.71 years. This indicates that there is a small degree of variability in the age of patients in this sample, suggesting that dengue fever affects individuals across a fairly wide age range.

In terms of gender, out of the 200 patients, 110 were male and 90 were female. This equates to 55% of the patients being male and 45% being female. This shows a slightly higher incidence of dengue fever in males in this sample, but the difference is relatively small.

Table 2: Mean Values for Hematological and Liver Function Parameters in a Dengue Fever

Parameter	Mean Value
Platelet Count (10 ⁹ /L)	100
Hematocrit (%)	45
AST (U/L)	55
ALT (U/L)	45

The table outlines the mean values for various hematological parameters and liver function tests in a hypothetical group of 200 patients with dengue fever. For platelet count, the mean value observed was 100 x 10⁹/L. This value is significantly lower than the typical normal range of 150-400 x 10⁹/L, suggesting that thrombocytopenia, or low platelet count, is common in this patient group. Thrombocytopenia is a known complication of dengue fever and can be a risk factor for more serious complications such as dengue hemorrhagic fever.

The average hematocrit value was 45%, which falls within the normal range for both men (38-52%) and women (36-48%). However, in dengue fever, it's important to monitor this parameter closely as an increased hematocrit may indicate plasma leakage, a serious complication of the disease.

The mean values for the liver function tests, Aspartate Aminotransferase (AST) and Alanine Aminotransferase (ALT), were 55 U/L and 45 U/L respectively. These values are slightly elevated compared to typical normal ranges (AST: 10-40 U/L, ALT: 7-56 U/L), indicating possible liver damage or inflammation, which can occur in severe cases of dengue fever.

slightly higher than that of the fever, at 0.033, reflecting a greater variability in this symptom among patients.

Pain behind the eyes, joint pain, and muscle pain were also common, presenting in 60%, 55%, and 50% of patients respectively. The corresponding standard errors for these symptoms were all 0.035, suggesting similar levels of variability in their occurrence. Rashes were observed in 45% of the patients, while 40% of patients experienced

nausea or vomiting. Both these symptoms had the same standard error of 0.035. Lastly, bleeding was the least common symptom, observed only in 10% of the patients (20 out of 200), with a standard error of 0.021.

Table 4: Mean values and standard deviations (SD) of Dengue IgM and IgG antibody levels

Antibody	Mean	SD
Dengue IgM	1.65	0.84
Dengue IgG	10.25	3.12

This table presents the average (mean) levels and variability (standard deviations) of Dengue IgM and IgG antibodies in patients diagnosed with Dengue fever. The Dengue IgM antibodies have a mean value of 1.65 with a standard deviation of 0.84. IgM antibodies are typically the first antibodies to be produced by the immune system in response to an infection and are a marker of a current or recent infection.

The Dengue IgG antibodies have a mean value of 10.25 with a standard deviation of 3.12. IgG antibodies are produced later in the course of an infection and usually persist for a long time after the infection has cleared. High levels of IgG antibodies may indicate a past infection with Dengue fever. The standard deviation values indicate the spread or variability in the data. The higher the standard deviation, the more diverse the antibody levels are in the patient group

Discussion

The present study aims to investigate the clinical profile of dengue infection. The results provide valuable insight into the age, gender distribution, hematological and liver function parameters, clinical symptoms, and antibody response in a cohort of 200 patients diagnosed with Dengue fever. The patient age has a mean of 35 years, with a relatively low standard error, indicating the broad age range that Dengue fever affects. This is consistent with the understanding that Dengue is a global disease affecting all ages [7].

The slightly higher proportion of male patients (55%) aligns with some studies, such as that of Gupta *et al.* [8], which identified a higher prevalence in males. However, it's noteworthy to mention that gender distribution in Dengue infection can vary greatly depending on the region and other socio-demographic factors.

The observed mean platelet count was considerably lower than the standard range, reflecting the common occurrence of thrombocytopenia in Dengue fever, a complication well-documented in literature [9]. The mean hematocrit value was within the normal range, but close monitoring is vital in Dengue patients due to the risk of plasma leakage, a hallmark of severe Dengue [10].

Elevated AST and ALT levels, indicating potential liver involvement, also align with previous studies reporting hepatic damage in severe Dengue cases [9]. The prevalence of clinical symptoms such as fever, headache, eye pain, joint pain, muscle pain, rash, nausea/vomiting, and bleeding in your sample is consistent with the typical clinical presentation of Dengue fever, as outlined by WHO guidelines (World Health Organization, 2009) [11]. Variability in these symptoms reiterates the clinical heterogeneity of Dengue fever presentations.

Finally, your findings concerning the levels of Dengue IgM and IgG antibodies contribute to the understanding of the body's immune response to Dengue infection. The mean IgM level at 1.65 with a SD of 0.84, and IgG at 10.25 with a SD of 3.12, demonstrates the dual response of the immune system to infection. The appearance of IgM antibodies signifies recent infection, while the presence of IgG antibodies indicates either a past infection or the secondary stage of the current infection [12].

In conclusion, your study offers an in-depth perspective on the clinical and immunological profiles of Dengue patients, which can be critical for clinical management and prognosis.

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