

Study of clinical manifestations of dengue cases in a tertiary care hospital, Bangalore, Karnataka

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Abstract

Background: Symptomatic dengue virus infections can present with a wide range of clinical manifestations, from mild febrile illness to a life-threatening shock syndrome or organ dysfunction.

Aim and Objectives: To study the clinical manifestations and laboratory findings of dengue cases, which is important for patient management and crucial for saving life.

Material and Methods: Hospital-based cross-sectional study conducted from July to December 2015, included suspected dengue cases aged 16 years and above admitted in the medical wards of the hospital. Detailed epidemiological, clinical, and laboratory parameters recorded. Chi-square (χ^2) test and descriptive statistics were analyzed using SPSS (17.0).

Results: Of the total 114 patients, 64 (56.1%) males and 50 (43.8%) were females. Majority of the affected patients were in the age group of 31–40 years (6 (31.5%)). Commonest symptom and sign observed was fever in 103 (90.3%). Signs of quadrant/epigastric tenderness, tachycardia, flushing were observed in more than > 50% of the patients and bradycardia, right upper shifting dullness, evidence of pleural effusion, shortness of breath, low blood pressure, low urine output, cold extremities were observed in less than 30% of patients. The commonest complication was severe abdominal bloating (8 (7.0%)), major bleeding and hepatitis in 5 (4.3%) of the patients. Briefly, 13 (11.4%) required the ICU treatment. In total, 107 (93.8%) had thrombocytopenia, raised AST and ALT in 89 (78.0%), leucopenia in 74 (64.9%), ascites in 71 (62.2%), gall bladder wall edema in 64 (56.1%), and hematocrit in 28 (24.5%) of the patients. Also, 92 (80.7%) patients were NS1 positive.

Conclusion: Manifestations of dengue cases are acute and varied. Proper confirmation of diagnosis, early institution of therapy helps in dengue prevention and management.

KEY WORDS: Dengue, dengue fever, hospital, clinical manifestation

Introduction

Dengue infection is a major health problem in our country. Globally the incidence of dengue has increased in the recent years. The World Health Organization (WHO) estimates that

presently about two-fifths of the world population is at risk for this viral infection.^[1] India is one of the seven identified countries in the South-East Asia region regularly reporting incidence of dengue fever/dengue hemorrhagic fever (DF/DHF) outbreaks and may soon transform into a major niche for dengue infection in the near future.^[2] Until mid-1990s, dengue was reported from only three of the four South Indian states, namely, Andhra Pradesh, Karnataka, and Tamil Nadu. All the four serotypes of the virus have been in circulation and documented in Tamil Nadu.^[3] During all these epidemics, children < 15 years of age were quite severely affected, but majority of infection occurred in active adults in the age group of 16–60 years. Symptomatic dengue virus infections can present with a wide range of clinical manifestations, from mild

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febrile illness to a life-threatening shock syndrome or organ dysfunction.^[6] The 2009 WHO revised criteria classify dengue virus infection into dengue with or without warning signs and severe dengue (dengue with severe plasma leakage, severe bleeding, or organ failure).^[7] Both viral and host factors are thought to contribute to the manifestations of disease in each infected individual. The clinical profile is important for patient management and crucial for saving life. The present study was undertaken to assess the varied clinical manifestations as well as laboratory findings of dengue patients admitted in tertiary care hospital.

Material and Methods

The study was approved by the Institutional Ethics and Research Committee. Informed consent was taken. A hospital-based cross-sectional study was conducted. Study population included suspected dengue cases aged 16 years and above admitted in the medical wards of the hospital from July 2015 to December 2015. Patients with the following complaints – fever, myalgia, arthralgia, headache, retro-orbital pain, rashes whose serology showed the evidence of dengue disease were included. A proforma with detailed epidemiological, clinical, and laboratory parameters recorded during the hospital stay, was used as a tool for data collection. Investigations like complete hemogram, blood urea, serum creatinine, liver function tests, along with serum amylase and lipase, chest X-ray, ECG, and abdominal ultrasonography were carried out as indicated.

The diagnosis of DF, DHF, and dengue shock syndrome (DSS) were based on the WHO criteria.^[1,7] Dengue antibodies were demonstrated by a rapid test-immunochromatographic assay for the rapid qualitative detection of IgM and IgG antibodies to dengue virus in human serum, plasma, or whole blood. Platelet counts and hematocrit values were recorded at the time of admission and repeated at intervals depending on the clinical course. Patients were followed-up through the entire course of hospitalization until discharge and follow-up revisit.

Case Definition of DF

Acute febrile illness with two or more of the following manifestations: headache, myalgia, arthralgia, retro-orbital pain, rashes, hemorrhagic manifestations, leucopenia, and supportive serology or occurrence at the same location and time as other confirmed cases of DF [WHO].^[1]

Statistical Analysis The data collected was tabulated in SPSS. The Chi-square (χ^2) test was used to evaluate statistical differences in categorical variables between the groups. P-value < 0.05 was considered significant. Descriptive statistics like numbers and percentages were enumerated for all categorical variables such as clinical characteristics and biochemical tests. All statistical analyses were performed using the SPSS statistical package, version 17.0 (SPSS).

Results

Out of the total 114 patients with DF studied, 64 (56.1%) were males and 50 (43.8%) were females. Majority of the affected patients were in the age group of 31–40 years with 36 (31.5%), followed by 23 (20.1%) in 21–20-year age group. Both the genders were almost affected equally by the DF (Table 1).

Of the total 114 patients with DF the preexisting morbidities recorded were 22 (19.2%) with hypertension, 17 (14.9%) with type 2 diabetes mellitus, 9 (7.8%) with COPD/asthma, 7 (6.1%) with major bleeding tendency, 6 (5.2%) with chronic kidney disease, 4 (3.5%) with cardiovascular accidents, and 2 (1.7%) with chronic liver disease.

Commonest symptom and sign observed were fever in 103 (90.3%) of the patients and skin rash in 47 (41.2%). More than > 50% of the patients presented with the symptoms of reduced appetite, headache, myalgia/polyarthralgia, nausea/vomiting, and abdomen pain/bloating. Whereas minor bleeding tendency, low backache, loose stools, plueritic chest pain, breathlessness, altered sensorium were symptoms in less than < 25% of the patients. Signs of quadrant/epigastric tenderness, tachycardia, flushing were observed in more than > 50% of the patients and bradycardia, right upper shifting dullness, splenomegaly, evidence of pleural effusion, shortness of breath, low blood pressure, low urine output, cold extremities were observed in less than 30% of patients (Table 2).

The commonest complication observed was severe abdominal bloating in 8 (7.0%) patients, followed by major bleeding and hepatitis in 5 (4.3%) of the patients (Table 3).

Out of total of the 114 patients with DF, 13 (11.4%) required the ICU treatment, of the ICU admitted patients, 8 (61.5%) had severe abdominal bloating, 5 (38.4%) had major bleeding, severe hepatitis, shortness of breath due to pleural effusion. Multi-organ failure, hypotension observed in 4 (30.7%) of the patients. About 3 (23.0%) had metabolic acidosis and acute kidney injury.

The median stay in ICU for the 13 patients was 4 days which ranged from 2 to 12 days. Briefly, 13 patients from ICU and all patients from the wards were discharged home after clinical cure with total of 111 out of 114 patients, 3 patients died with DF, of these 3 patients two patients died from multi-organ failure with associated diabetes mellitus and had chronic liver disease as co-morbidity. One patient had unresponsive shock with severe metabolic acidosis – in a frail elderly man who was malnourished and had multiple co-morbidities. The average hospital stay for patients admitted was 4 days, on follow-up, 8 patients had post-viral arthralgia lasting for a median of 3 months. After discharge from the hospital, none of the patients developed any residual organ injury or disability.

About 107 (93.8%) of the patients had thrombocytopenia (platelet count < 1.5 lakhs), followed by raised AST and ALT in 89 (78.0%) of the patients, leucopenia in 74 (64.9%), ascites in 71 (62.2%), gall bladder wall edema in 64 (56.1%), and hematocrit in 28 (24.5%) of the patients (Table 4). Serological findings

Table 1: Age and sex characteristics of patients with dengue fever

Age in years	Male, N = 64	Female, N = 50	Total, N = 114
16–20	4(6.2)	5(10.0)	9(7.8)
21–30	13(20.3)	10(20.0)	23(20.1)
31–40	21(32.8)	15(30.0)	36(31.5)
41–50	13(20.3)	8(16.0)	21(18.4)
51–60	6(9.3)	6(12.0)	12(10.5)
> 60	7(10.9)	6(12.0)	13(11.4)
Total	64(56.1)	50(43.8)	114

$P > 0.05$.

Table 2: Clinical features in patients with dengue fever

Symptoms	Cases (N = 114), n (%)	Clinical findings	Cases (N = 114), n (%)
Fever	103(90.3)	Fever	101(88.5)
Reduced appetite	97(85.0)	Quadrant/epigastric tenderness	62(54.3)
Headache	82(71.9)	Tachycardia	57(50.0)
Myalgia/polyarthralgia	77(67.5)	Flushing	53(46.4)
Nausea/vomiting	72(63.1)	Skin rash	47(41.2)
Abdomen pain/bloating	67(57.8)	Bradycardia	33(28.9)
Breathlessness	9(7.8)	Right upper shifting dullness	30(26.3)
Skin rash	47(41.2)	Evidence of pleural effusion	21(18.4)
Minor bleeding Tendency	20(17.5)	Shortness of breath	12(10.5)
Major bleeding	7(6.1)	Low blood pressure	11(9.6)
Low backache	60(5.2)	Low urine output	9(7.8)
Loose stools	18(15.7)	Cold extremities	7(6.1)
Plueritic chest pain	15(13.1)	Splenomegaly	11(9.6%)
Altered sensorium	5(4.3)		

in the study subjects showed that in 92 (80.7%) patients NS1 was positive, IgM positives in 30 (26.3%) of the patients, followed by IgG positives in 22 (19.2%) of the patients as depicted in Figure 1. Discussion

Dengue infection results in a wide spectrum of clinical severity, from self-limiting DF to severe dengue. DF was first

Table 3: Complications observed among the dengue patients

Complications	Cases (N = 114), N (%)
Total ICU admissions	13(11.4)
Severe abdominal bloating	8(7.0)
Major bleeding	5(4.3)
Severe hepatitis	5(4.3)
Shortness of breath due to pleural effusion	5(4.3)
Multi organ failure	4(3.5)
Hypotension	4(3.5)
Metabolic acidosis	3(2.6)
Acute kidney injury	3(2.6)
Respiratory failure	2(1.7)
CNS bleed	1(0.08)
Myocarditis with LV failure	1(0.08)

Table 4: Laboratory findings in patients with dengue fever

Laboratory findings	Cases N (%), N = 114
Thrombocytopenia	107(93.8)
Elevated aspartate aminotransferase (AST) and alanine aminotransferase (ALT)	89(78.0)
Leucopenia	74(64.9)
Ascites	71(62.2)
Gall bladder wall edema	64(56.1)
Unilateral pleural effusion	56(49.1)
Bilateral pleural effusion	31(27.1)
Hematocrit change > 20%	28(24.5)

referred as “water poison” associated with flying insects in a Chinese medical encyclopedia in 992 from the Jin Dynasty (265–420 AD). It is transmitted mainly by *Aedes aegypti* mosquito and also by *Aedes albopictus*.^[6] All four serotypes can cause the full spectrum of disease from a subclinical infection to a mild self-limiting disease, the DF and a severe disease that may be fatal, the DHF/DSS.^[6] 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.^[9] Majority of the patients in the present study were diagnosed in the months of July to December 2015 which was in accordance with various other studies.^[10,11] These findings indicate that preventive measures against dengue virus infection should come into full action during water stagnation periods after the initial bouts of rain-fall and at the end of monsoon. This study reveals an outbreak

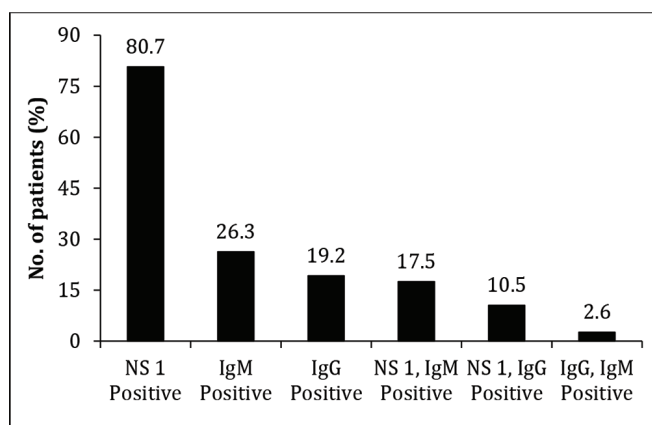


Figure 1: Serological findings in patients with dengue fever.

equitably distributed amongst the both the genders with a predilection for the younger age group between 30 and 40 years is similar with Eastern India's study.^[9] Predominant presentations of fever, reduced appetite, myalgia polyarthralgia, gastrointestinal symptoms like abdominal pain and intractable vomiting observed is in concordance with many other studies.^[9,11–15] About 26.3% right upper shifting dullness (hepatomegaly) noted in the current study is comparably higher than studies in Kolkata^[9] and the other studies.^[12,15,16] Hypotension recorded in 11 (9.6%) of the patients is consistent with studies in Kolkata^[9] and Bangalore.^[12] CNS features said to be very uncommon.^[17] Bleeding manifestations varied from minor in 20 (17.5%) to major bleeding tendency in 7 (6.1%) of patients while Kumar et al reported in 26.6% of the patients^[18] and Murtoza et al reported in 9.6% of the patients.^[15] The complications varied from severe abdominal bloating to all the major systemic manifestations is as similar to many other studies across different regions.^[18,8–13,15,18] About 12% of the patients required the ICU referral.^[9] Dengue patients who were either between 50 and 59 years old or with pre-existing diabetes had higher risk of ICU requirement, compared with dengue patients who are less than 30 years old or without diabetes or any other co-morbidity, respectively.^[11,13,14] The 2.0% of the case fatality rate observed was in patients with associated co-morbidities,^[18] which demonstrates that prompt diagnosis and early institution of therapy creates significant changes in prognosis.^[9,11,13]

Laboratory investigations reported, apart from thrombocytopenia gross leucopenia and transaminitis were significant derangements consistent with several studies across India.^[9,15,21,12,11] Increased hematocrit was observed in 24.5% of patients, which is in accordance with Anuradha et al, where they reported in 30.0% of patients^[20] where as some other studies reported higher hematocrit values of up to 58%.^[15] NS1 antigen reactive patients found more in number when compared with seropositive IgM and IgG antibody patients.^[11,14,15,19,21] Strength of this study is that it describes the acute clinical manifestations and role of laboratory investigations in DF patients which

helps in early diagnosis, institution of therapy, and prevention of mortality. Limitations of this study are requirement of tertiary referral hospital-based center and extrapolation of the results into general population is poor.

Conclusion

To conclude DF is an important public health problem in tropical countries like India and it can present with varied acute clinical manifestations. A high index of suspicion is required to detect and timely manage the DF. The results of this study describe the acute clinical manifestations and role of laboratory investigations in DF patients. Proper confirmation of diagnosis, early institution of therapy, public awareness, and vector control are important factors to be taken into consideration in the prevention and management of dengue.

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