

Clinico-Laboratory Profile of Dengue Patients at Sir T. Hospital, Bhavnagar, India

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Abstract- Dengue fever is caused by any one of four types of dengue viruses (DEN1-DEN4), spread mainly by *Aedes aegypti*. India had the largest number of dengue cases, with about 33 million apparent and another 100 million asymptomatic infections occurring annually. The patients typically present with the sudden onset of fever, frontal headache, retroorbital pain. The laboratory diagnosis can be made by IgM ELISA or by NS1 antigen-detection ELISA during the acute phase. This research was conducted from January 2018 to December 2018 at Sir T. hospital and Government Medical College in Bhavnagar, Gujarat. The patients having complaints of fever, headache, myalgia, arthralgia or rash, were clinically examined, and laboratory investigated for dengue with NS1 and/or IgM dengue antibody. A total of 536 patients was screened, of which 112 patients were diagnosed as dengue fever at 21% dengue positivity rate, based on detection of NS1 (46/304, 15%), and anti-dengue IgM (66/232, 28%) in their sera. The majority of the patients were males (77/112, 69%). The majority of patients were in 11–30 years' age group (66/316, 21%). Fever (100%) was the chief presenting complaint, followed by headache (83, 93%), and myalgia (79, 89%). The highest number (28) of dengue patients was observed in the month of October 2018. According to this study results, the physicians in the dengue-endemic area should be aware of dengue in acute febrile illnesses and use the appropriate laboratory tests such as NS1 antigen and IgM antibodies for early dengue diagnosis. This can help clinicians to prevent morbidity and mortality associated with dengue.

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Introduction

Dengue fever is a mosquito-borne viral disease caused by a single positive-stranded encapsulated RNA virus belonging to the flavivirus genus of the Flaviviridae family and transmitted by *Aedes* mosquitoes, mainly by *Aedes aegypti* (1). Dengue fever is caused by any one of four types of dengue viruses (DEN1-DEN4), spread by mosquitoes that thrive in and near human lodgings. When a mosquito bites a person infected with a dengue virus, the virus enters the mosquito. When the infected mosquito then bites another person, the virus enters that person's bloodstream (2). A study done at the University of Oxford has estimated that India had the largest number of dengue cases, with about 33 million apparent and another 100 million asymptomatic infections occurring annually (1). WHO estimated that two-fifth of the population in tropical countries, around 2.5 billion people are vulnerable. Approximately 50 million dengue

infections occur worldwide, of which 500,000 people are hospitalized with DHF annually (3). The patients with dengue fever typically present with the sudden onset of fever, frontal headache, retroorbital pain, and back pain along with severe myalgias, break-bone fever. Additional signs and symptoms, including anorexia, nausea or vomiting, and cutaneous hypersensitivity, may appear in illness (4). The disease spectrum may vary with asymptomatic illness to life-threatening diseases like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) (5). The characteristic laboratory finding for the disease is leukopenia. Other laboratory findings include thrombocytopenia, elevations of serum aminotransferase concentrations. The diagnosis can be made by IgM ELISA or paired serology during recovery or by antigen-detection ELISA or RT-PCR during the acute phase. There is no specific therapy management of dengue, besides supportive care. The principle of management of disease includes fluids, rest, and

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antipyretics (6).

Dengue viral infection remains a challenge for the treating physician. So this research was planned to study the clinico-laboratory profile of dengue patients at our hospital set-up.

Materials and Methods

This research was conducted from January 2018 to December 2018 at Sir T. hospital and Government Medical College in Bhavnagar, Gujarat. The patients having complaints of fever, headache, myalgia, arthralgia, or rash, were clinically examined, and laboratory investigated for dengue. The patients who were either hospitalized or managed as outdoor patients with NS1 (non- structural protein) antigen positivity and/or IgM dengue antibody positivity were included in the study.

Depending upon the duration of fever, NS1 Antigen or IgM Capture ELISA (Mac ELISA) was done at the Department of Microbiology, Government Medical College, Bhavnagar. Serum samples obtained in the initial phase (within five days of sickness) were qualitatively tested for dengue viral NS1 antigen using Platelia Dengue NS1 Ag ELISA (BIO-RAD).

Serum samples of patients with fever of more than five days duration were tested for the presence of anti-dengue IgM antibodies using MAC ELISA NIV (National Institute of Virology), Pune, and as recommended by the National Vector Borne Disease Control (NVBDCP, Delhi).

The data of all the patients who came for the treatment of dengue fever were included for the analysis. Epidemiological, clinical, and laboratory data were gathered and then compiled to study the clinico-laboratory profile of dengue patients at our hospital set-up.

Results

Based on this symptomatology, a total of 536 patients were screened during the period of January 2018 to December 2018. Out of these 536 patients, a total of 112 patients was diagnosed as dengue fever at 21% dengue positivity rate, based on detection of dengue non-structural protein 1 (NS1) (46/304, 15%), and anti-dengue IgM (66/232, 28%) in the serum samples.

Out of 112 dengue fever patients, the majority of the patients were male (77/112, 69%). Female formed 21% (35/112) of the cohort. The maximum numbers of dengue patients were in the 11-30 years' age group (66/316,

21%).

All the patients (100%) of dengue had complained of fever as the chief presenting symptom. Headache was found as the presenting symptom in the majority of patients (83, 93%), followed by myalgia (79, 89%). On clinical examination, conjunctival suffusion (66, 74%), Retro-orbital pain (27, 30%), and skin rashes (12, 14%) were found in dengue patients.

The maximum number (28) of dengue positive patients was observed in the month of October 2018 (Chart).

To look for platelet and leucocyte counts, blood samples were drawn for routine hemogram at the time of admission. On laboratory investigations, it was found that 40 (36%) patients had thrombocytopenia (platelet count <50,000/cumm) at the first clinical presentation. It kept on falling in some of the patients further during hospitalization with minimum platelet count found was 9,000/cumm. Raised serum SGPT and SGOT were found in 22 (20%) and 24 (22%) patients, respectively. Leucopenia was noticed in 14 (13%) of dengue cases.

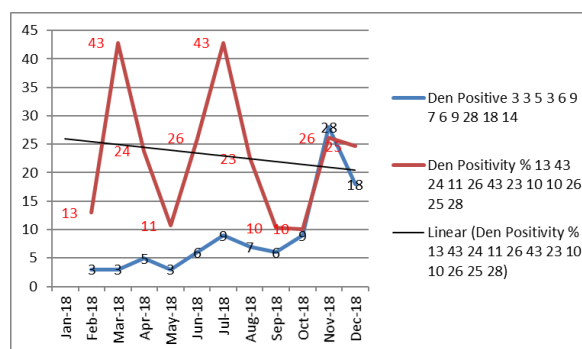


Chart. Month-wise dengue seropositivity (The year 2018)

Discussion

A rise in the number of dengue cases over the past few years has been attributed to rapid urbanization with construction activities, and poor sanitation facilities, contributing to fertile breeding areas for mosquitoes. It is also seen that, increase in alertness among medical personnel following the epidemics, and availability of diagnostic tools in the hospitals have contributed to more detection of dengue cases (7). The desert coolers, drums, jars, pots, buckets, flower vases, plant saucers, tanks, cisterns, bottles, tins, tires, roof gutters, refrigerator drip pans, cement blocks, cemetery urns, bamboo stumps, coconut shells, tree holes act as the fertile breeding areas for mosquitoes (8).

The serum samples obtained from fever patients were tested for the presence of NS1 antigen and anti-dengue

IgM antibodies, as recommended by the National Vector Borne Disease Control (NVBDCP, Delhi). In our study, 536 fever patients were dengue suspects, and 112 patients were diagnosed as dengue fever at 21% dengue positivity rate. The remaining 79% serologically negative suspects may be suffering from other illnesses, which share clinical manifestations with dengue fever, such as chikungunya, influenza, measles, rubella, infectious mononucleosis, and meningococcal infection (9).

The majority (77/112, 69%) of the dengue patients were male in our study. Ravindu *et al.*, reported that 65% of the dengue patients were male in their research. The probable reason, as per their citation, could be that males are more involved in outdoor activities, and females generally wear clothes covering most parts of the body (10). In 2016, Chakravarti A *et al.*, found 70% female positivity for dengue in their study at 2000-bedded Tertiary Care Government Hospital in Delhi (11). So, variations can be found among studies, describing significant gender-related differences in serological results for the detection of NS1 antigen and IgM antibody. One of the putative factors, out of many maybe, that in many of the Asian communities, women are less likely to be taken for care at a hospital when ill or are taken at late stages of the disease when no other options are available (12).

We found that maximum dengue patients were young patients, in 11-30 years' age group (66/316, 21%). This finding is in line with the result of many other researches. Ravindu *et al.*, reported that most of the patients in their study were from the young age group, 33.3% from 11-20 yrs., 40.4% from 21-30 yrs (10). Chakravarti A *et al.*, reported that the mean age for both males and females was 27 years (11). Sreenivasulu T *et al.*, from Telangana, reported in 2017 that the younger age group of 15-25 was most commonly affected in their study (13).

In dengue, the patient generally complains of abrupt onset of high fever (40°C/ 104°F) accompanied by severe frontal headache, retro-orbital pain, joint and muscular pains, skin rash (14). We observed that fever was the most common presentation (100%), which is in agreement with other similar studies from India and Southeast Asia (15-18).

Headache and myalgia were seen in the majority of the cases. Retro-orbital pain was noticed in 30% of the cases. The conjunctival injection was documented in 74% of cases and skin rash in 14% of the cases. Mandal SK *et al.*, in a similar study, have documented headache in 62.16% and rash in 37.84% of the cases.¹⁹ Difference in the percentage of rash may be attributed to different strains of dengue viruses.

In the present study, the maximum number (28) of dengue positive patients was observed in the month of October 2018. In our study, the peak incidence of dengue occurred in the month of October, which correlates with other Indian studies (20-21). This may be supported by scientific evidence of temperature and rainfall influencing dengue incidence. According to IDSP data, dengue fever cases peak during the post-monsoon period between mid-Septembers to November (22).

According to this study results, the physicians in the dengue-endemic area should be aware of dengue in acute febrile illnesses and use the appropriate laboratory tests such as NS1 antigen and IgM antibodies for early dengue diagnosis. This can help clinicians to prevent morbidity and mortality associated with dengue.

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