Original Article

Frequency of the Dengue Fever in Patients with Acute Febrile Illness at Diagnostic & Research Laboratory, Hyderabad

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ABSTRACT

OBJECTIVE: To determine the frequency of dengue fever in patients with acute febrile illness and to evaluate the clinical profile of dengue positive cases.

METHODOLOGY: This cross sectional, descriptive study was conducted at Diagnostic & Research Laboratory, LUMHS Hyderabad, Samples of the patients having history of acute febrile illness, within the period of June 2018 to August 2018, were confirmed for the presence of dengue IgM antibody and NS1 antigen. Dengue IgM antibody was detected by using the technique enzyme linked immunosorbent assay (ELISA) while dengue NS1 antigen was detected by immune-chromatographic technique (ICT) rapid device. Clinical and hematological findings were also recorded.

RESULTS: An aggregate of 11250 cases presented with classical characteristics of Dengue fever were collected out of which majority of the cases were in there third decade of life expectancy with median age of 30 years. Seventy four percent (74%) i-e 8,325 patients were tested were found to be positive for dengue virus and remaining 2,925 (26%) appeared to be negative for dengue; from which 900 (8%) were positive for malarial parasite, 675 (6%) were diagnosed with typhoid fever and strikingly 1350 (12%) patients remained undiagnosed.

CONCLUSION: Fever along-with body ache followed by vomiting and abdominal pain were found to be the common characteristic symptoms of Dengue fever.

KEY WORDS: Dengue Fever, Aedes Aegypti, IgM, ELISA.

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INTRODUCTION

Dengue fever is a mosquito-borne major viral infection that causes mild to severe illness / disease[1]. Currently, World Health Organization (WHO) estimates 390 million dengue virus contaminations per annum out of which 96 million (67-136 millions) leads to dengue fever[2]. Dengue virus is a single, positive stranded ribonucleic acid (RNA) virus from the family Flaviviridae it has four different serotypes (DEN1-4) and is transmitted to the host by a mosquito vector[3].

Transmission of any one of the four dengue serotypes that are DENV1, DENV2, DENV3 and DENV4[4] human beings occurs through the sting of a disease-ridden female *Aedes aegypti* and less commonly by *Aedes albopictus* mosquitoes, which feed mostly at dusk and dawn, most frequently two hours after sunrise and few hours before sunset[5]. Noteworthy growths in the mosquito larval populations during the monsoon season may be a reason for the outbreaks of dengue fever[6]. Making its entrance in 1780, Benjamin Rush described this illness as break bone fever, from then Dengue fever (DF) has become as a key community health alarm with clinical spectrum ranging from self-limiting infection to the life frightening hemorrhagic disease.

Clinically, dengue infection can be presented in three different manifestations including classical dengue fever, dengue hemorrhagic fever and dengue shock syndrome. The patients with Classical dengue fever will have abrupt arrival of high-pitched fever, escorted by severe retro-orbital headache, myalgia, arthralgia, nausea, vomiting and macular or maculopapular rash[7]. Presence of hemorrhagic rash or hemorrhagic manifestation in complement to classical DF describes the Dengue Hemorrhagic Fever (DHF), while the dengue shock syndrome is illustrated by hypotension, altered mental status and late capillary filling[8]. Dengue hemorrhagic fever and dengue shock syndrome manifests severe complications and can steer to death[9]. The fatality rate which is high as 10% can be decreased to as low as 1% with early recognition and proper treatment. This virus affects about 50-100 million people per annum. The cases of dengue hemorrhagic fever range from 20,000 to 500,000 per annum.

Thrombocytopenia is a noticeable element of infection, mostly seen within the range 57,000±5477.07/μL[10]. A platelet tally below 100×10^9/L is a pinpointing measurement for dengue hemorrhagic fever (DHF)[11]. There are multiple cases in which thrombocytopenia occurs including dengue infections but the cause of this remains unknown; mostly thrombocytopenia is due to bone marrow suppression and peripheral platelet destruction. Peripheral immune complex mediated demolition maybe the key factor for thrombocytopenia in dengue infection[12].

Incidence of dengue fever has increased at an alarming rate in Pakistan and the disease has now become an important public health problem[13]. It is therefore important to examine current demographic trend and clinical profile of DF in the region.

METHODOLOGY

This cross sectional descriptive study was conducted at Diagnostic & Research Laboratory, LUMHS Hyderabad, Following all aseptic measures a total of 6ml whole blood samples were collected by the help of sterilized syringe, from the patients representing acute febrile illness during the period commencing from June 2018 to August 2018. 3 ml blood sample was drawn in vacutainer containing ethylene-di-amine tetraacetic acid (EDTA) as an anticoagulant from which complete blood count indices were measured by XN 1000 6 parts fully automated analyzer by Sysmex Japan, Leishman Stain peripheral blood smear was prepared to examine the morphology of different cells and to observe the malarial parasites. While 3 ml blood was drawn in plain vacutainer, which was subjected to centrifugation at 5000 RPM for 10 minutes to drawn serum. Which was tested for the presence of dengue IgM antibody and NS1 antigen, using enzyme linked immunosorbent assay (ELISA) and immunochromatographic (ICT) rapid tests respectively completely relying as per manufacturer literature for efficacy[14]. All afebrile patients were not encompassed in the study.

Clinical and hematological outcomes were documented. Basic statistical tools were used for the analysis of data.

RESULTS

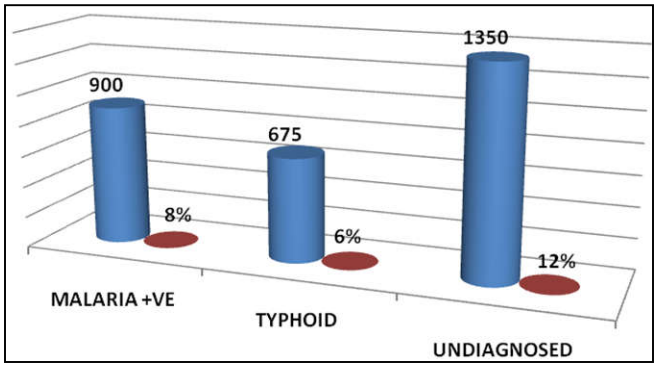
A total of 11,250 patients presenting classical characteristics of Dengue fever were tested. Majority of them were in the third decade of their lives with median age of 30 years (range 1-75 years) with male [7941] to female [3309] ratio was 2.4:1, out of these, 8,325(74%) patients tested were positive for dengue virus. Remaining 2,925(26%) appeared Dengue negative, 900(8%) were positive for malarial parasite, 675(6%) were diagnosed with typhoid fever and strikingly 1350(12%) patients remained undiagnosed (Graph I).

All the patients had fever (100%), majority alongwith Body ache (43%) followed by vomiting (26%), abdominal pain (19%), headache (6%), maculopapular rash (4%) and Bleeding (2%) (Graph II).

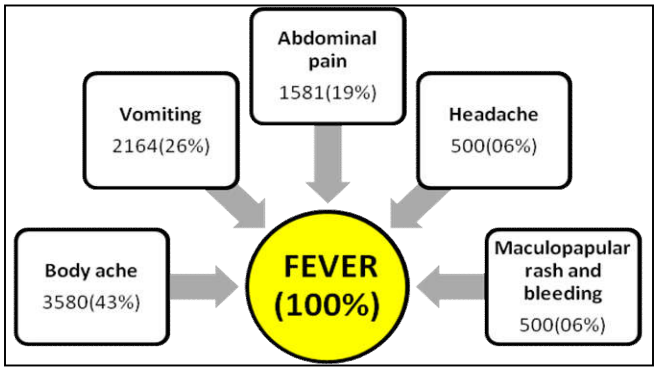
The laboratory result suggested that thrombocytopenia was common in 7,325 (88%), leucopenia in 6,495 (78%) and raised alanine aminotransferase levels in 5,493 (66%) patients (Graph III).

1,728 patients were admitted in different hospitals of Hyderabad and majority improved clinically with a mortality rate of only 1%.

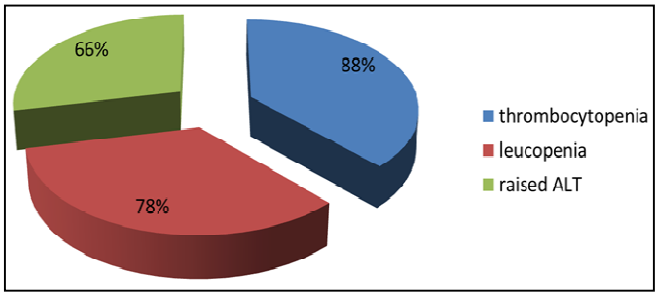
GRAPH I: GRAPH SHOWING DIAGOSIS OFPATIENTS OTHER THAN DENGUE (DENGUE NEGATIVE PATIENTS)



GRAPH II: THE GRAPH SHOWING SIGN AND SYMPTOMS IN DENGUE POSITIVE PATIENTS



GRAPH III: THE PIE CHART SHOWING LABORATORY FINDINGS IN PATIENTS



DISCUSSION

Dengue is developing a serious health hitch for our country. In Pakistan the first reported dengue case was from the metropolitan city of Karachi in 1980's. While Dengue virus has been seen in all the provinces but till 2011 only a few sporadic cases were reported from Peshawar, Haripur, and Abbotabad. The first large-scale epidemic was observed in 2011 in the Province of Punjab, particularly in its largest city of Lahore where more than 21,000 dengue-positive cases and 279 deaths were reported[19].

The present study was conducted at diagnostic and research laboratory of pathology Department regarding the clinical & biochemical features of DF cases. The Dengue was so far confirmed by the ELISA that is been considered the most beneficial test for dengue diagnosis, due to its high sensitivity and user friendly procedure. Mostly ELISA is used to detect acute phase (IgM) and convalescent phase (IgG) antibodies, and also for the detection of antigens (Ag). Due to its sensitivity for the detection of acute phase antibodies there is no any requirement for convalescence samples. Since anti-dengue IgM antibodies usually appears within five days of the first clinical symptom. However the IgM production differs significantly between the patients. Some patients will have IgM detectable on the 2nd to 4th day after the commencement of the symptoms, while others do not develop detectable IgM until the 8th day after the beginning of the disease. The dengue fever is nowadays is considered in the differential diagnosis of fever when it was first expressed. The differential diagnosis associated with DF includes a broad category of viral infections like Çhikungunya and other bacterial, rickettsial & parasitic infections that results in similar findings. It is impossible to diagnose Dengue infection only on clinical symptoms; therefore a definitive diagnosis requires viral isolation and/or serology[15, 16]. The type-specific immunity is life long while hetero type immunity persists for about 2-12 months. In the regions where dengue virus is endemic, cases are more prone to secondary infections with higher incidence of DHF or DSS[17]. In present study, dengue virus was found to be positive in 74% of the cases, while a study by Gul SN 2014[20] from Lahore shows 98% positive cases. Cases of DF below 30 years of age were 59%; these findings are consistent with local and international studies from India & Malaysia. Mostly cases were reported in the months of July, August, September & October. The main presenting feature, noted in dengue patients was high grade fever (100%) of cases which is also noted by Ahmed S et al[8] from Karachi. Vomiting was observed in 26% cases in present study while a study by Khan HMS et al[21] mentioned vomiting in 45% cases. Thrombocytopenia & leucopenia was recorded as common laboratory findings of DF in our study patients. Platelet compared less than 150 × 10^9/L was seen in 88% of patients. Riaz MM et al[22] described thrombocytopenia in 83% cases. Leucopenia was reported in 30% cases by Ahmed S et al[23], however in present study it was found in 78% cases, while a study conducted by Khan AH 2010[7] at the same institute shows 80%. Raised liver enzymes were found in 66% cases in this study population which is in accordance to Soni A 2017[24] In present study 90% Dengue positive patients showed antigen within 1st week while antibody was found negative because antibody usually develops after 7-8 days of infection, these findings were in accordance with Singh MP et al[25] This study highlights that the dengue IgG, IgM, IgA and dengue antigen test by ICT method had low sensitivity but high specificity and had a positive predictive value (0.74 or 74%).

CONCLUSION

Fever along with body ache followed by vomiting and abdominal pain were the common symptoms of Dengue fever. Educating healthcare professionals and public regarding early, appropriate diagnosis is particularly essential to prevent life threatening complications like hemorrhage and shock. A combined methodology is required to reduce the hazard through vector control approaches and improvement of socioeconomic trends[18].

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