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RETROSPECTIVE SEROEPIDEMIOLOGY STUDY OF DENGUE VIRUS INFECTION AND THE ASSOCIATION BETWEEN DENGUE VIRUS INFECTION AND LIVER AND KIDNEY FUNCTION.

Clinical Microbiology

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ABSTRACT

Background: Dengue virus was first isolated in India in the year 1945 and is endemic in both urban and semi-urban areas. Dengue virus, belonging to the genus Flavivirus and Family Flaviviridae, are mosquito borne viruses and the principal vector, Aedes aegypti is a day-biting mosquito of public importance that breeds in natural or artificial waters. **Methods:** A total of 100 patients serum samples were collected and processed. The samples were subjected to J.Mitra Dengue DAY 1Test (Rapid visual test for the detection of Dengue NS1 Antigen and differential detection of IgM & IgG antibodies in Human serum/Plasma).Samples were also screened for biochemical markers such as SGOT, SGPT, Serum albumin,Serum creatinine and platelet count . **Results:** The weighted overall seroprevalence was 18% for NS1 antigen, and 2% for anti-DENV IgM, respectively. A significant rise of DEN NS1 seropositive rate had been noted in age group 20-30 years. **Conclusion:** Serological diagnosis should be done in all clinically suspected dengue cases for early initiation of treatment and thereby to minimize the mortality.

KEYWORDS

INTRODUCTION

Viral haemorrhagic fevers are becoming increasingly common in the tropics and subtropics. Dengue fever is currently the most important arthropod borne viral disease because of its widespread distribution in more than 100 countries and its potential for extensive outbreaks of life-threatening disease.

Dengue illnesses are caused by any one of the four serologically related viruses designated as DENV-1, DENV-2,DENV-3 and DENV-4[1]Infection with any one of these serotypes mostly causes a mild, self-limiting febrile illness (Classical dengue fever), however, a few cases develop severe life threatening dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). [1]

DHF and DSS are severe forms of the disease characterized by sudden onset of fever and nonspecific signs and symptoms. The critical stage of DHF occurs 24 hrs before to 24 hrs after the temperature falls to or below normal. During this time, haemorrhagic manifestations usually occur and signs of circulatory failure may appear. Laboratory tests show thrombocytopenia and evidence of vascular leak syndrome. Hypovolemia, shock and death may occur in case of DSS. [2]

The diagnosis of DF and DHF is made on clinical and epidemiological grounds. In some areas, DHF overlaps with the distribution of other viral haemorrhagic fevers, thereby causing a confusion in the diagnosis.

Therefore, serological diagnosis by detection of IgM and IgG antibodies to dengue in the serum is essential for monitoring the treatment. Commercial kits are available, which can help in differentiating between primary and secondary dengue infections. A rapid dengue detection test kit is used for the preliminary diagnosis
With the direct and indirect evidence of biochemical alterations that are related to severity of dengue. Studies had reported that patients with DHF have elevated serum levels of transaminases (aspartate aminotransferase [SGOT] and alanine aminotransferase [SGPT]), [3,4]

Since the occurrence of dengue infections and complications like DHF and DSS are increasing, this study was conducted to study the incidence of dengue infections, to evaluate the seropositivity and to determine the role of biochemical markers as predictors of severity of dengue fever, thereby to create awareness about the preventive measures to be taken by the general public and the health care system, and to improve our infrastructure for diagnosing and treating dengue infections.

MATERIALS AND METHODS

The study is undertaken on the patients admitted in the Gandhi Medical College and Hospital(GMCH), Hyderabad during the study period of three months (June 2017 to August 2017). Dengue fever patients will be screened for biochemical markers such as SGOT, SGPT, Serum creatinine,Low platelet count through lab investigations.

Blood samples from 100 patients with clinical features suggestive of dengue, were included in this study. The samples were collected aseptically and serum was separated by centrifugation technique and stored at -70˚C.

The DENV-specific NS1 Antigen, IgM and IgG antibody of the samples were determined by J.mitra & co. Dengue Day 1 Test kit.It consists of two devices: one device for detection of Dengue NS1 antigen and second device for the differential detection of Dengue IgM/IgG antibodies in Human serum/plasma. Dengue NS1 Antigen device contains two lines; 'C' (Control line) & "T" (Dengue NS1 Antigen test line). Test line is coated with anti-dengue NS1 Ag. When a sample is added to the device, Dengue NS1 antigen if present in the sample will bind to the anti-dengue NS1 gold colloidal conjugate making antigen antibodies complex. This complex migrates along the membrane to the test region and forms the visible pink line at "T" as antibody-antigen-antibody gold colloid forms. Dengue IgM/IgG test device contains three lines; "C" (Control line), "M"(IgM test line) & "G"(IgG test line).IgM test line is coated with anti-human IgM and IgG test line is coated with anti-human IgG.When a sample is added to the device, IgG and IgM antibodies in the sample react with anti-human IgM or IgG antibodies coated on the membrane respectively.

Dengue NS1 Ag :
Sensitivity–96% and Specificity– 98%.

Dengue IgM/IgG Antibody test :
Sensitivity–95% and Specificity– 97%.

RESULTS

Demographic profile of participants
Total number of samples tested : 100
Total number of Dengue positive cases : 19

AGE DISTRIBUTION OF DENGUE CASES

AGE IN YEARS	NO OF Positive	PERCENTAGE
<20	3	15.7
21-30	9	47.4
31-40	4	21.05
41-50	1	5.2
51-60	0	0
>60	2	10.5

SEX DISTRIBUTION OF DENGUE CASES

Gender	No.of Positives	Positive %
Male	14	73.68
Female	5	26.3

SEROPOSITIVITY OF DENGUE

Total No.of patients	No.of Dengue positive	Positive %
100	19	19%

COMPARISION OF LAB PARAMETERS BETWEEN DENGUE POSITIVE AND NEGATIVE

Parameter	Dengue Positive	Dengue Negative
Elevated SGOT(AST) (>40U/mL)	5	9
Elevated SGPT(ALT) (>35U/mL)	6	7
Thrombocytopenia (Platelet< 1.5lakhs/cu.mm)	9	9
Elevated serum Creatinine (>1.5)	0	0

DISCUSSION & CONCLUSION

Dengue has been increasingly recognized as an emerging infectious disease for the last four decades. The global burden of dengue has grown dramatically in recent years. Rapid diagnosis of dengue is crucial for proper patient care. As NS1 antigen and IgM antibody appears early during the disease course, its detection is a valuable tool for rapid diagnosis.

The seropositivity of dengue cases (Table-2) in the present study among clinically suspected fever cases was 18%.It is less than the study conducted by Khoa TD et al, in 2005 at Vietnam, the seropositivity was 53% [5].

A higher distribution of dengue cases in the present study was seen in the (Table-3) 21-40 year age group 12(66.6%), followed by 0-20 age group 4(22.22%) and above 40 age group 2(11.1%).This was similar to the study conducted by Preeti Bharaj et al in 2008, in which the common age group involved was 20-40 years(35.4%) , followed by 0-20 years group(20.8%).[6] Ekta gupta et al, in 2006, in her work also showed that the maximum number of cases in a 3 year study period was seen in the 21-40 year age group. [7]

In this study, an increased incidence of dengue was found among male patients 13(72.2%), as compared to females 5 (27.77%) (Table-4). In the study done by Nadeem Sajjad Raja et al in 2006, they observed an incidence of 51.55% in males and 48% in females[8], and in the study by Kurukumbi et al in 2001[9], it was observed that the incidence was 61.5% in males and 38.5% in females.

While abnormal liver function (increases in ALT and/or AST levels and decreases in albumin and/or total protein levels) is a common clinical finding in dengue infections, we did not find evidence for a significant association between them in our study.

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