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SEROPREVALENCE OF DENGUE IN A TERTIARY CARE HOSPITAL, TRICHY.

Microbiology

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ABSTRACT

Dengue is a vector borne Arboviral disease spread by Aedes mosquitoes. Four serotypes are recognized [1]All four serotypes are prevalent in our country[2].

Aim of the study:

To find the prevalence of the dengue infection based on age, sex, seasonal distribution of the disease. Acute infection is detected by detecting both NS1 antigen & IgM antibody.

Methods:

This is a retrospective study of one year duration from January 2018 to December 2018. The serum sample from 1400 suspected cases of dengue were subjected for the ELISA test to see IgM antibody and NS1 antigen.

Results:

Out of 1400 cases tested 216(15%) were positive for dengue by IgM ELISA, 1184(85%) were negative, 4 (0.2%) were positive for both IgM antibody and NS1 antigen

Conclusion:

So early and specific serological marker coinciding with day of illness should be done to diagnose dengue infection.

KEYWORDS

Dengue, IgM antibody, NS1 antigen.

INTRODUCTION:

Dengue is an arboviral disease under flaviviridae family. This virus has single positive strand RNA with 3 structural and 7 non-structural proteins.[3]Approximately 1.8 billion populations are at risk for dengue infection which includes SEAR and western pacific region. In 2012 SEAR countries reported 0.29% of cases, of which India contributes 20% of cases.

The incidence of dengue infection is increasing with 75808 cases in the year 2013, the highest incidence since 1991.4In India the dengue case was recorded in Chennai in 1780.[4] Next virologically proved dengue epidemic was at Calcutta in the year 1963-644. The serotype DEN-2 was isolated from vellore in the 1964.

The pathogenesis of dengue starts with the bite of Aedes species that inoculate the dengue virus into the circulation. viremia with local lymph node spread occurs. This lasts for five days coinciding with the febrile phase. It also involves the multiplication of the virus in all the immune system cells present in the organs and in the circulation[5]. Particularly this happens in the vascular endothelium also.

The pathogenesis of DHF is due to antibody dependent enhancement, memory T cell response and shift from Th1-Th-2 response that results in 'Cytokine Tsunami'6. IL-2,IL-8,IL-12,TNF-α,INF-gamma are the cytokines involved in Dengue fever. In case of DHF IL-2, IL-4,IL-6,IL-8,IL-10,TNF-α,TGF-β are released[6].

Dengue has symptomatic illness with asymptomatic seroconversion that matches with the critical phase of complications. The disease has three phases- febrile, critical and recovery phase. It has a constant progress with severity during defervescence i.e. in the afebrile period. Patients develop a high-grade fever that lasts for 2−7 days. Now the critical phase starts with increased plasma leakage and heamatocrit accompanied by shock and organ damage. Slow recovery of the illness occur in the next 2-3 days.

MATERIALS AND METHODS:

Inclusion criteria: Blood samples taken from patients having suspected signs and symptoms of dengue and its complications.

Exclusion criteria: Patients having fever for more than seven days.

Sample collection: with aseptic precaution 2ml of blood without anticoagulant was taken in a sterile test tube. The sample was centrifuged at 2500 rpm for 15 minutes. The supernatant serum is separated and used for ELISA tests.

METHOD : About 1400 blood samples were received at our lab during the period from January 2018 to December 2018. Most of the patients had fever for 5-6 days, few of them had bleeding disorder and abdominal pain without fever at the time of blood collection. Four of the patients had fever for less than 3 days.

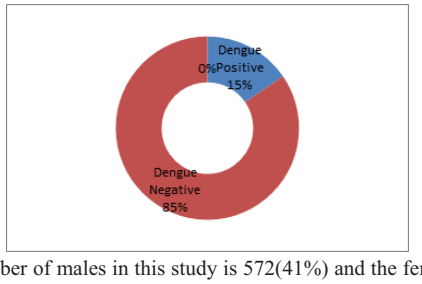
Serum samples are subjected for IgM immuno capture ELISA, kit obtained from National Institute of Virology, Pune. The results of the tests are interpreted as positive if the OD value of the sample is more than negative OD by 3.0.

The NS1 analyte is quantified by the sandwich ELISA technique by using the Dengue NS1 Ag MICROLISA (J.Mithra &Co.Pvt.Ltd). The results are interpreted as Dengue positive if the Dengue NS1 Ag units of the sample is more than 11 and as negative if the same is less than[9].

RESULTS AND DISCUSSIONS:

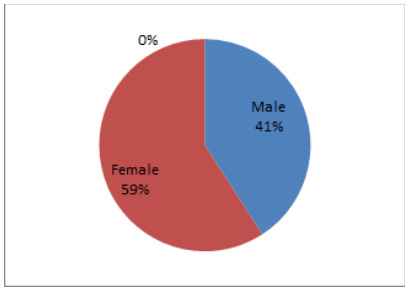
This is a retrospective study and the data is collected and analyzed from the whonet software. This is an one year study from January 2018 –December 2018. Totally 1400 cases were received during the study period and subjected to IgM ELISA, NS1Ag by ELISA as requested according to the day of illness. Out of this 1400 samples,216 (15%)are positive for dengue by IgM ELISA, 1184(85%) samples are negative(Fig:1) chakravarthy et al.in his yearly study showed that positive and negative percentage of dengue cases during the year 2008 is 21.2% and 78.8% respectively[7]. This shows a decreasing trend in positive cases of dengue in a period of 10 year duration. This could have happened due to increase in awareness about the dengue preventive measures among the public. Also 4(0.2%) samples are positive by both IgM ELISA and NS1Ag in this study.

Figure1: Total Dengue cases tested .



Total number of males in this study is 572(41%) and the females are 828(59%) in Number (Fig2). But in most of the other studies the number of males outnumber the females.[7,8,9]

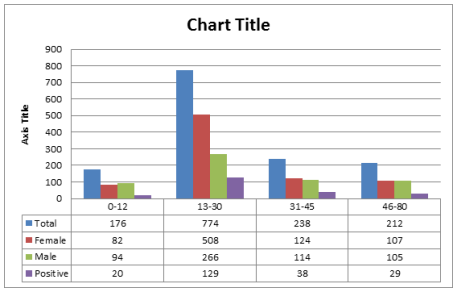
Figure: 2 sex wise distribution of cases.



Cases in 0-12 years is 176(13%), 13-30 years is 772(55%), 31-45 years is 238(17%) and from 46-80, it is 212(15%) cases. The positive cases in the age groups 0-12 years, 13-30 years, 31-45 years and 46-80 years are 20,129,38,29 respectively (Fig:3).

This indicates adolescence and young adult are most commonly affected (13-30yr). Similar results are shown in a study by Arun etal.[9] In all the age groups females predominate except in the pediatric age.

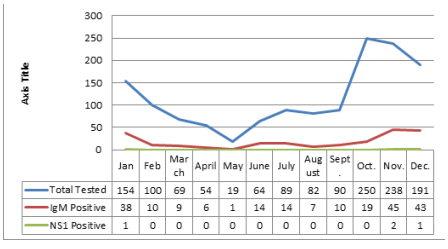
Figure:3 Age wise distribution of cases.



Seasonal variations are also noted in the study. In the month of January, November and December the total number of cases tested are more i.e154, 238 and 191cases respectively. (Fig: 4)

This might be due to the post rainy season that lead to the pooling of the clean water enhancing the breeding mosquitoes.

Figure: 4 month wise distribution of dengue cases.



The number of positive cases during the above said months in this study are 38 (17.6. %), 45(20.8%) and 43(19.9%) respectively. The highest percentage of positive cases seen during the months of November& December are nearly equal followed by 17.6% in the month of January. (Table1) In a study by Gupta et al more number of cases were tested from September –November and October month carries high number of dengue positive cases.[10]

Table 1: Month wise distribution of Dengue positive cases

Month	Total Tested	IgM Positive	Dengue Positive (%)	IgM & NS1 Positive
Jan	154	38	17.6	1
Feb	100	10	4.6	0
March	69	9	4.2	0
April	54	6	2.8	0
May	19	1	0.5	0
June	64	14	6.5	0
July	89	14	6.5	0
August	82	7	3.2	0
Sept.	90	10	4.6	0
Oct.	250	19	8.8	0
Nov.	238	45	20.8	2
Dec.	191	43	19.9	1
Total	1400	216	100	4

In this study among the 216 dengue positive cases, 4 cases had fever for ≤ 3 days. Most other cases had fever for 5-6 days, the few presented with complications of dengue like bleeding diathesis, abdominal pain and shock syndrome without fever. NS1 Ag and IgM antibody were positive for those patients who presented with ≤ 3 days of fever. This confirms presence of the acute infection, which needs demonstration of both viral antigen or viral RNA along with IgM antibody.[3,11] The delay in sending samples after 5 days could be due to delay in attending OPD by the patient after failed initial treatment for fever elsewhere.

So early diagnosis of the dengue infection is mandatory not only to manage its complications, but also to differentiate it from lot of other clinical diseases that typically mimics dengue. In this study both acute infection and probable dengue cases are diagnosed.[3]

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