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Original Article

A study on the prevalence of dengue fever in a tertiary government hospital

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ABSTRACT

Dengue virus causes acute febrile illness in tropical and sub-tropical settings and its clinical manifestations ranges from mild form of dengue fever (DF) to the more severe forms of dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). A range of diagnostic methods has been developed to support patient management and disease control. The aim of the study is **t**o determine the prevalence of Dengue Fever and Dengue Hemorrhagic Fever in cases presenting with Clinical features suggestive of suggestive of Dengue in a tertiary hospital. The present study was conducted in the Department of Microbiology, S.V. Medical College, Tirupati from August 2007 to July 2008. Results: Seasonal trend shows the incidences of more number of cases along with positivity were seen in the month of August and October.

KEYWORDS: Aedes, Dengue Fever; NS1; ELISA; Tirupati

INTRODUCTION

Dengue viral infection (DVI) is a dangerous and debilitating disease. Alarmingly, 40 % of the world's population is living in the areas having a risk of being infected. WHO estimates 50–100 million dengue cases with approximately 22,000 deaths each year [1]. Dengue made its debut as early as 1780, when Benjamin Rush described the condition as "break bone fever". This hitherto unfamiliar infection has now grown to demand the attention of all public health care providers. A mosquito borne fast emerging viral infection manifesting in four serotypes capable of causing dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS), poses an increasingly perilous situation due to lack of antiviral drugs or vaccine [2]. Dengue is one of the most important mosquito borne viral disease with wide spectrum of clinical presentation and often with unpredictable clinical evolution and outcome. It is a self limiting disease transmitted by bite of an infected female Aedes mosquito [3]. Currently the morbidity and mortality of dengue fever is more than any other arboviral disease. Amplified mosquito population due to deterioration in the public health infrastructure and changing climatic conditions have an important role in the inceasing incidence of Dengue fever [4,5].

There are four distinct dengue virus (DENV) serotypes that share antigenic relationships (DENV-1, DENV-2, DENV-3 and DENV-4) [6]. Secondary infection is caused by a second exposure by a different serotype and can result in dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). Major clinical features include high fever, hemorrhagic events, circulatory failures and the fatality rate can be as high as 30% [7].

Objective: To determine the prevalence of Dengue Fever and Dengue Hemorrhagic Fever in cases presenting with Clinical features suggestive of Dengue in a tertiary hospital.

MATERIAL AND METHODS

The present study was conducted in the Department of Microbiology, S.V. Medical College, Tirupati from August 2007 to July 2008. A total of 200 blood samples were collected from patients admitted in S.V.R.R.G.G.H with clinical features suggestive of Dengue fever were screened. The serum samples were tested for IgM antibodies for dengue virus by dengue IgM capture ELISA (Panbio pvt Ltd, Australia). Collection of blood sample: The blood sample was obtained from the patient by venipuncture following strict aseptic precautions and allowed to clot at room temperature and then centrifuged. The serum was

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separated. Storage of serum sample: Serum sample was refrigerated (2-8ºC) or stored frozen in a deep freezer (-20ºC), if not tested with in two days.

RESULTS

A total of 200 patients admitted in the S.V.R.R Government General Hospital, Tirupati with the symptoms suggestive of Dengue fever were included in the present study. All the patients' serum samples were tested for dengue IgM antibodies by IgM capture ELISA (PanBio, Australia). This test is a solid phase immunoassay, based on an immunocapture principle.

Table 1: Month-wise distribution of cases

Month	No of cases	IgM Positivity
August (2007)	84	36
September (2007)	30	12
October (2007)	43	15
November (2007)	9	2
Deember (2007)	0	0
January (2008)	0	0
Fenruary (2008)	9	2
March (2008)	2	0
April (2008)	2	0
May (2008)	0	0
June (2008)	2	0
July (2008)	19	8
	200	75

Seasonal trend shows the incidences of more number of cases along with positivity were seen in the month of August and October. It is due to post monsoon and post monsoon session which is helpful for the mosquito to grow.

Table 2: Age and Sex-wise distribution of cases

Age in years	Males	Females	Total
≤20	117	74	191
21-40	3	1	4
41-60	1	3	4
61-70	0	1	1
Total	121	79	200

There were 200 patients tested for dengue, 121 were males, and 79 were females and most of the cases were of the ≤20 years age group (Table: 2). Most of the cases reported were from the young age groups. These were people who were active outdoors, whether working, schooling or playing outside their homes.

Table 3: Male and Female distribution with positivity

Sex	Total	No of IgM Positive samples
Males	121	49 (40.5%)
Females	79	26 (32.9%)
Total	200	75 (37.5%)

All the 200 cases were tested for IgM antibodies to Dengue virus by IgM capture ELISA. Of the 200 samples tested, 75 samples are positive for IgM antibodies to Dengue. More number of positive cases were observed among the males (Table:3).

Table 4: IgM Positivity: Age-wise and sex-wise distribution

	Males		Females	
Age (in years)	Total no of cases	IgM Positivity	Total no of cases	IgM Positivity
≤20	117	49	73	22
21-40	3	0	2	1
41-60	1	0	3	0
61-70	0	0	1	0
Total	121	49	79	26

Of the total 117 cases (male) of the age group 0 – 20 forty nine cases were Ig M positive for dengue. Of the total 73 female cases of the age group 0-20 twenty two cases were positive for dengue IgM

The study suggests that the cases presenting with hemorrhagic manifestations were found to have 81.2% in IgM positivity. The next predominant features associated with more number of IgM positive cases were retro bulbar pain, altered sensorium, Ascites, skin rash and conjunctival congestion. (Table: 5).

Table 5: IgM Positivity in Patients with Various Presenting Features

Presenting Feature	Total No of cases	No of IgM Positive cases
Mild febrile syndrome	200	75 (37.5%)
Severe headache	184	75 (37.7%)
Body aches/Arthralgia's	171	75 (43.9%)
Nausea and vomiting	169	74 (43.8%)
Pedal oedema	151	70 (46.4%)
Skin rash	139	71 (51.1%)
Pain abdomen	110	54 (49.1%)
Conjunctival congestion	82	65 (79.2%)
Hepatosplenomegaly	60	42 (70.0%)

Altered sensorium	57	43 (75.4%)
Retro bulbar pain	53	41 (77.3%)
Ascites	43	27 (62.3%)
Hemorrhagic manifestations	22	18 (81.2%)

DISCUSSION

The present study was conducted on 200 cases presenting with suspected dengue fever admitted at S.V.R.R. Govt. General Hospital, Tirupati, from August 2007 to July 2008. Among the 200 patients tested, 75 (37.5%) were found to be positive for IgM antibodies to Dengue by, IgM capture ELISA method (PanBio Pvt Ltd, Queensland, Australia).

We found that maximum number of dengue suspected cases were reported in the months of August. Similar findings were reported by Kumar A et al who observed a gradual increase in cases from June with a peak in September, during all the seven years of the study [8]. Gunasekaran P et al also reported high percentage of IgM positivity during the months of September and October in all the three years [9].

Efficient and accurate diagnosis of dengue is of primary importance for clinical care (i.e. early detection of severe cases, case confirmation and differential diagnosis with other infectious diseases). Antibody response to infection differs according to the immune status of the host [10]. IgM antibodies are the first immunoglobulin to appear. since patients with mild or classical DF can develop severe infection later, therefore it is important to look for signs/symptoms to facilitate the early prediction of severe dengue i.e. DHF/DSS. The clinical manifestations might always offer the earliest marker in predicting severe disease. Therefore, dengue with warning signs should be monitored vigilantly in order to avoid its progression to severe disease [11].

Of the 200 cases 49 (40.5%) were positive among 121 males, 26 (32.9%) were positive among 79 females. In the present study, the ratio of the positive cases among the males and female was 1.61:1. Similar results were found in studies conducted by different authors [12-17].

In Shah et al study, the age group most affected was between 8 months and 14 years and the mean age was 8.3 years [14]. Farid Uddin Ahmed et al showed the mean age of 8.4 years [18]. In another study by Hoti et al [17], 1-15 years old children were most affected. In the present study most of the reported cases were from younger age group 0-20 yrs. These were the people who were active outdoors, whether working, schooling or playing outside their homes. A.aegypti is a day biter with increased biting activity 2 hours after sunrise and early hours of evening.

Rapid strip test was used for diagnosis of dengue fever. Primary dengue infection was observed in 15% of cases (only IgM) while in the rest, either or both IgM and IgG were found. Farid Uddin Ahmed et al [18] studied about the incidence of Dengue and Dengue hemorrhagic fever in 73 children admitted at Chittagong Medical College Hospital, Bangladesh. The mean age affected was 8.4 years, affecting mostly the children of 5-9 years age. 26 children were positive (36%) for dengue fever. Rajendran et al conducted a study in Sulurpet, Andhra Pradesh, India, and found 22.9% cases were positive for dengue IgM antibodies, of which 34.6% were children [12].

In the present study the seropositivity for dengue fever was 37.5%. Among the males, 49 out of 121 were positive for IgM dengue (40.5%) and among the females 26 were positive out of 79(32.9%). The incidence of dengue was more in males (40.5%) than in females (32.9%). The incidence was high in males (n=49), because they go for outdoor work and they are more exposed to the bite of Aedes aegypti. A significant difference between the male and female groups was noted by Eng Eong Ooi et al [19]. He noted that males were affected more than females (1.6:1). But their study population was predominantly of adults.

In the present study the most common clinical presentation was fever (100%). There was also a high incidence of headache, nausea, vomiting, myalgia and rash. It was also observed in this study that the cases presenting with hemorrhagic manifestations, retro bulbar pain and altered sensorium showed concordance with IgM seropositivity for dengue. Similar observations were made in a study conducted by Malavige, et al in 2007 [20].

Rajendran et al (2000) in a study conducted in Sullurpet, of Andhra Pradesh, India found that more number of cases presented during the September-November (n=262) [12]. The isolation of dengue viruses or demonstration of dengue viral genome sequences is useful for confirmation of dengue virus infection. These tests are only available in reference laboratories. The detection of IgM by capture ELSIA is helpful for the diagnosis of acute dengue virus infection. The serological diagnosis of dengue fever has a role in categorizing

primary and secondary infection and it also serves as a predictor of disease progression and mortality especially in the severe forms i.e. DHF/DSS.

CONCLUSION

Early detection of cases helps the public health authorities to take appropriate control measures to prevent the spread of the disease and also helps in the early management of cases. Community participation with emphasis on behavioral change is very much essential for sustenance of dengue control. Constant surveillance for dengue viral infection throughout our country is required to take necessary action by health authorities.

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