CHAPTER

8

Dengue Profile in Guwahati

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INTRODUCTION

The word 'dengue' is derived from the Swahili phrase Ka-dinga pepo, meaning "cramp- like seizure". The first clinically recognized dengue epidemics occurred almost simultaneously in Asia, Africa and North America in the 1780s. The first clinical case report dates from 1789 of 1780 epidemic in Philadelphia is by Benjamin Rush, who coined the term 'break bone fever' because of the symptoms of myalgia and arthralgia. The term dengue fever came into use after 1828. In 1906, Aedes mosquitoes transmitting the dengue fever was confirmed and in 1907 Dengue was the second disease after 'yellow fever' that was shown to be caused by virus.

HISTORY

In India the first epidemic of clinical dengue-like illness was recorded in Madras in 1780 and first virologically proved epidemic of dengue fever (DF) occurred in Calcutta and Eastern Coast of India in 1963-1964.[1] Dengue virus was isolated in Japan in 1943 by inoculation of serum of patients in suckling mice[2] and at Calcutta in 1944 from serum samples of US soldiers. [3] The dengue haemorrhagic fever (DHF) started simmering in various parts of India since 1988. [4]The major outbreak of DF/DHF was reported in Delhi and neighboring states in 1996. Data for the last 10 years reveal maximum numbers of cases due to DF/DHF were reported in year 1996 (16,000) while the next increase was noted in 2003 (21,000). [5]

VIROLOGY

Dengue virus is a RNA virus of the family flaviviridae. The dengue virus genome contains 11,000 nucleotide bones. They have 3 different protein and molecules that form virus particles (C prM and E) and 7 other types of protein molecules (NS1, NS2, NS2b, NS3, NS4a, NS4b, NS5) that are found in infected host cells and are required for replication of virus. There are 4 strains of virus ex. DEN1, DEN2, DEN3, DEN4. All four serotypes can cause full blown disease. Infection with 1 serotype is believed to produce lifelong immunity to that serotype, but he can be infected with other serotype in future. It is transmitted mainly by Aedes aegypti mosquito and also by Aedes albopictus. A mosquito that takes a blood meal from an infected person becomes infected with virus. In 8 to 10 days the virus spreads to tissues like salivary gland from the gut of the mosquito. Dengue may also get transmitted via infected blood products and through organ donation. Vertical transmission from mother to child can also occur during pregnancy.[5]

Table 1: As per record of National Vector Borne Disease Control Program, Directorate General of Health Services, Ministry of Health and Family Welfare Dengue case details and death since 2010 in Assam

Year	Case	Death
2010	237	2
2011	0	0
2012	1058	5
2013	4526	2
2014	27	0
2015	1076	1
2016	2099*	3

*Till 2nd October 2016

WHO CLASSIFICATION

The WHO 2009 classification divides dengue fever into two groups: uncomplicated and severe, though the 1997 WHO classification is still widely used. [6] The 1997 classification divide dengue into undifferentiated fever, dengue fever and dengue hemorrhagic fever. Four main characteristic manifestation of dengue illness are i) continuous high fever lasting 2-7 days, ii) hemorrhagic tendency as shown by a positive tourniquet test, petechiae or epistaxis, iii) thrombocytopenia, iv) evidence of plasma leakage manifested by haemocencentration, pleural effusion and ascites etc.

DENGUE IN STATE OF ASSAM AND CAPITAL CITY OF GUWAHATI

Dengue arbovirus has recently emerged as a major public health concern with increased morbidity in Assam. [7] Entomological survey carried out in different time periods reveals the prevalence of potential dengue vectors in this region. [8]A comprehensive entomological survey conducted during 2004-2005 in the seven states of northeast region of India revealed that the region is rich in known dengue vectors, viz. Aedes aegypti and Aedes albopictus. [9]

It was in 2010 that for the first time 237 dengue cases and 2 deaths confirmed to be due to dengue were recorded in Assam state (Table 1). In the following years except in 2011, there was manifold increase in 1058 (5 deaths) and 4526 (2 deaths) confirmed cases in 2012 and 2013. [10] For each year, of the total confirmed cases, majority (69%-91%) were recorded in Guwahati, the capital city of Assam, during the post-monsoon months in September to December. Guwahati is the largest and fast growing metropolis and gateway of northeast India. Over the past decade there

Table 2: Clinical Characteristics of Dengue positive Hospitalized patients in Guwahati city

Clinical & Laboratory Parameters	% of patient
Fever	100
Headache	88.23
Myalgia	82.35
Arthralgia	54.41
Nausea/Vomiting	63.23
Abdominal Pain	11.76
Hepatomegaly	5.88
Skin Rash	30.88
Eyeball Pain	36.76
Conjunctival Injection	69.11
Palatal Petechiae	2.94
Diarrhea	33.82
Ns1ag	85.29
Igm	19.11
Igg	5.88
Leukopenia (<4000/cumm)	54.09
Thrombocytopenia (<50000/Cumm)	23.88
Hemorrhagic Manifestations	17.64
Icterus	00.00
Ascites	00.00

has been increase urbanization, deforestation, massive developmental activities, rapid population movement and increased air connectivity between Guwahati and other by metropolitan cities resulting in increased receptivity for mosquito breeding and possible importation and spread of dengue virus through human host in the region.

The disease is currently spreading to semi- urban areas of other districts of Assam supported by serological evidence for circulating dengue virus serotypes. [9] Given the reported regional abundance of disease vectors and case incidence in city areas, Ae. Aegypti is held the most probable mosquito vector transmitting dengue virus,[11] and recently has been incriminated for circulating dengue virus 2 serotype. With the available data for prevalence of disease vectors and case incidence, there is a strong possibility of local transmission happening evidence by listing of cases without any travel history.[10]

CLINICAL PROFILE OF DENGUE IN GUWAHATI, ASSAM

The clinical manifestation of dengue and a complete medical history for early diagnosis are important for promote supportive therapy. The sign and symptoms of dengue being nonspecific, the physician must maintain a high index of suspicion if a clinical diagnosis of dengue is to be made. [12] The state of Assam has experienced an increased number of reported fever cases of unknown origin in recent years. The doctors rarely consider dengue as a differential diagnosis of an acute febrile illness. The confirmed dengue cases were consistent with classical

Table 3: Districtwise distribution of dengue cases in Asam

Districts	Dengue-positive cases
Kamrup	39
Barpeta	2
Sivasagar	2
Nagaon	1
Baksa	4
Dibrugarh	1
Jorhat	1
Hojai	1
Cachar	2
Karbi angling	1
Nalbari	4
Morigaon	3
Others*	7

*others mentioned above are those patients who visited to endemic area but residing outside Assam.

descriptions like fever, headache, eye pain and vomiting. Fever was the most common clinical feature in almost all cases. The other most common presenting features were headache, eye pain and myalgia. However abdominal pain, diarrhea was observed in few numbers of cases. [13] The proportion of cases with headache, rash, eye pain and vomiting was significantly higher. Bleeding tendency was observed in minimum number of patients.[13] (Table 2)

A comprehensive picture of dengue epidemic that occurred in Assam state in 2016 is given in Table 3.

Although dengue cases were presented to our hospital from 12 districts of Assam, clearly Kamrup was the worst affected, and it alone shared 63.93% of the dengue cases.

Figure 1 shows the distribution of the percentage of the dengue cases in various age groups in either sex. It clearly reveals that the highest number of cases belonged to the age group 20-50 yrs. and males clearly outnumbered the females.

As the outbreak of dengue mainly occurred in the months of August to September of 2016, Figure 2 shows the monthly distribution of the cases.

This graph shows month wise no. of dengue cases presented to our hospital in 2015 & 2016 (Figure 3).

ASSOCIATED PROBLEM

Dengue may occasionally affect several other body systems. This may be either in isolation or along with the classic dengue symptoms. A decreased level of consciousness occurs in 0.5-6% of severe cases. This may be caused by infection of the brain by the virus or indirectly due to impairment of vital organs, for example the liver and other neurological disorders have been reported in context of dengue, such as transverse myelitis and Guillian Barre syndrome. Infection of heart and acute liver failure are among the rare complications of dengue. [5]

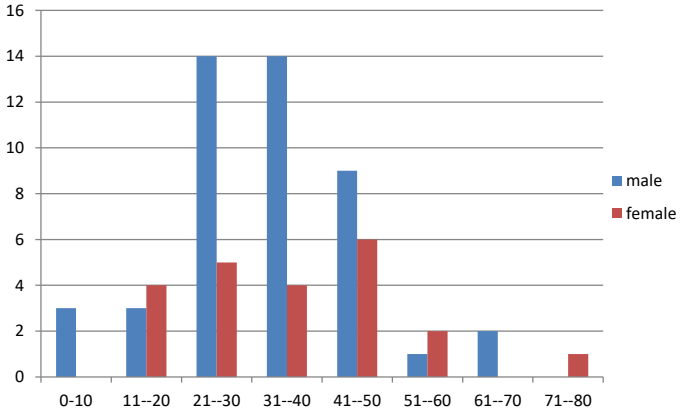

Fig. 1: Age and sex gradation according to IgM and/or NS1% positivity

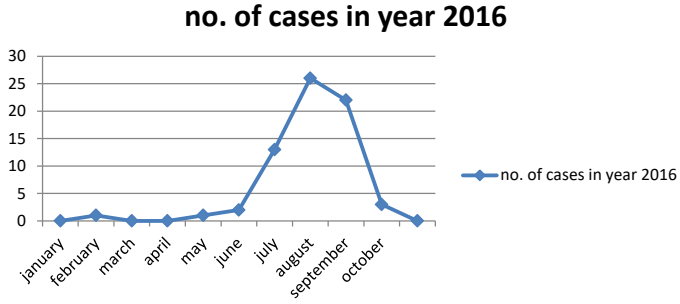

Fig. 2: Month wise distribution of the NS1- and/or IgM-positive dengue cases—Jan. to October 2016

LABORATORY FINDING (TABLE 4)

As per record (State Health Director Assam) which includes government hospital and private hospital of Guwahati, Assam (reported cases) a significant higher percentage of patients showed lower platelet counts. The percentage value of alanine transaminase and aspartate transaminase was significantly higher. Leucopenia was observedin few numbers of cases. Studies suggested that liver injury is a common finding in dengue infections and it is mediated by direct infection of hepatocytes and kupffer cells.[14] Recently studies suggested the use of markers such as Aspartate transaminase and Alanine transaminase as parameters to evaluate severity in patients with dengue fever.[15] Since grossly elevated liver enzymes are known to be an early warning sign for severe disease along with bleeding vigorous follow up in such patients is warranted.[14]

DIAGNOSIS OF DENGUE VIRUS INFECTION

Diagnosis of dengue virus infection is routinely done by demonstration of anti-Dengue virus (DV) IgM antibodies or by NS-1 antigen in patients serum depending upon day of illness using ELISA kits (prepared by National Institute of Virology Pune) and commercial kits.[16] Reverse transcriptase PCR (RTPCR) are being increasingly used in diagnosis of DV infection. A single tube nested PCR for detection and serotyping of DV was developed and used for detection of an infection by two viruses.[17] DV isolation in tissue culture cells and its sequencing is also being done.

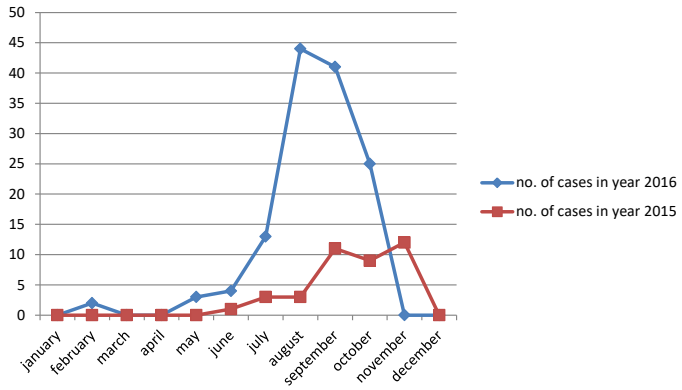

Fig. 3: Comparison of monthwise distribution of cases in 2015 & 2016.

Table 4: Laboratory finding of dengue positive Hospitalized patients in Guwahati city

Characteristics
Thrombocytopenia, < 1.5 X 105/mm^3
Leucopenia, <4000 cells/mm^3
Aspartate transaminase, > 40 U/L
Alanine transaminase, > 40 U/L

TREATMENT OF DENGUE VIRUS INFECTION

No specific treatment is available. The management of dengue virus infection is essentially supportive and symptomatic. NSAID is contraindicated. There are Indian studies which have contributed in terms of better management of dengue hemorrhagic fever/ Dengue shock syndrome. A rapid response to platelet and fresh frozen plasma transfusion is reported in a study. [18]Hippophaerhamnoides (Seabuckthorn SBT) leaf extract has been shown to have a significant anti-dengue activity.[19]

CONCLUSION

With the continued phenomenon of urbanization and prevailing climatic conditions of high humidity, extended monsoon and increasing distribution range of Ae aegypti it is projected the dengue will emerge as a major public health problem in capital city of Guwahati, Assam and northeast India. Since there is no vaccine available in northeast, Mosquito control is the most effective approach to the prevention of dengue transmission. Measure should be taken to control the aforementioned causes to prevent disease spread and reduce epidemic flare up. Need is to organize health education programme about dengue disease to increase community knowledge and sensitize the community to participate in integrated vector control programmes. Dengue is one of the major public health problems which can be controlled with active participation of the community.

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