ORIGINAL ARTICLE

CLINICAL AND LABORATORY PROFILE OF DENGUE FEVER

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ABSTRACT: AIM: Dengue is a major health problem in many parts of India and Gulbarga (North Karnataka) was previously not a known endemic area for dengue. Infection with dengue virus can cause a spectrum of three clinical syndromes, classic dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). The present study was undertaken to determine the disease profile of dengue virus infection in hospitalized patients. **METHODS AND MATERIAL:** One hundred patients admitted in Basaveshwar Teaching and General hospital with fever more than 38.5 degree Celsius and IgM dengue positive were selected. They were followed from the onset of fever to twelve days or till they are recovered according to WHO discharge criteria whichever is earlier. They underwent relevant investigations to identify specific organ dysfunction and categorize them into the spectrum of Dengue fever in accordance to WHO criteria. **RESULTS:** Out of 100 cases in this study 70 cases belongs to DF, 23 cases to DHF and 7 cases to DSS based on WHO criteria. All the cases had fever (100%). Other common symptoms noted were myalgia (61%), joint pain (54%), headache (66%), vomiting (55%), pain abdomen (48%), rash (41%), hepatomegaly (20%), bleeding (21%) and shock (8%). Hess test was positive in 24% patients. Low platelet count of less than 100, 000/cu mm according to WHO criteria was present in 73% patients. Deranged liver function test and renal parameters were seen in 26 and 8 patients respectively. Mortality documented was 7 patients due to delayed presentation. The average duration of hospital stay was 4.65 days. **CONCLUSION:** Dengue fever was a more common manifestation than DHF or DSS. During aepidemic, dengue should be strongly considered on the differential diagnosis of any patient with fever. The treatment of dengue is mainly fluid management and supportive. Early recognition and management of alarm symptoms is the key to better outcome.

KEYWORDS: Dengue fever, Dengue hemorrhagic fever; Dengue shock syndrome; Thrombocytopenia; IgM Dengue, WHO.

INTRODUCTION: The word dengue came from denga or dyengo which in Africa means hemorrhage. The first definite clinical report of Dengue is attributed to Benjamin Rush in 1789.[1] He coined the term "break- bone fever" because of the symptoms of myalgia and arthralgia.[2]

Dengue fever is distributed world-wide, involving nearly all tropical and subtropical countries, and hence has many names like-dandy fever, Denguero, denga, dunga, break-bone fever, bouguet, seven day fever, bonon, chapenonada, Knieueble, Tokkive- ana, Mal de genoux, homamguu, and coup-d-barre.[3]

Dengue virus (DENV) is an arthropod-borne single stranded RNA virus of genus Flavivirus.It is comprised of 4 closely related but antigenically distinct serotypes, DENV-1, -2, -3, and -4. Presently no specific therapies or vaccines are available to treat diseases or to

prevent DENV transmission. Illnesses caused by DENV infection include undifferentiated fever, dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS).[4]

Dengue ranks as the most important mosquito-borne viral disease in the world. Current estimates report that, at least 112 countries are endemic for Dengue and about 40% of the world populations (2.5-3 billion people) are at risk in tropics and sub-tropics. Annually 100 million cases of dengue fever and half a million cases of dengue haemorrhagic fever occurs worldwide.[5]

In India, the first major epidemic illness clinically compatible with dengue was reported from Madras in 1780, which later spread all over the country. Later, an outbreak of dengue like illness was reported in 1956 from Vellore, Tamil Nadu and since then, it has persisted in various parts of the country.[6]

Objectives of Study:

1. To study the various clinical presentations of dengue fever.
2. To study the hematological and biochemical parameters of dengue fever.
3. To study the outcome of the patients suffering from dengue.

METHADOLOGY:

Source of Data: The data was collected from patients admitted to Basaveshwara Teaching & General Hospital (BTGH) Kalaburgi, karnataka, with fever more than 38.5 degree C and IgM dengue positive during the period of 2012-2014.

Study Design: It is a prospective cohort study through sample and sampling techniques. A total of hundred patients admitted to the hospital with the history of fever of more than 38.5degreeCelsius and IgM dengue positive were selected using purposive sampling techniques. They were followed from the onset of fever to twelve days or till they are recovered according to WHO discharge criteria whichever is earlier.

The following investigations were done- total blood counts, ECG and IgM dengue using rapid chromatographic strip test and confirmed by Panbio Dengue IgM capture ELISA. Relevant test like chest x ray and USG abdomen were done to demonstrate pleural effusion, ascites etc, along with renal and liver function test. The diagnosis of dengue fever, dengue haemorrhagic fever and dengue shock syndrome will be based on WHO criteria. The patient was evaluated for signs and symptoms of plasma leak, bleeding manifestation and outcome in terms of mortality and number of days of stay in hospital.

Inclusion Criteria: Those patients admitted in BTGH Gulbarga having fever and IgM dengue positive.

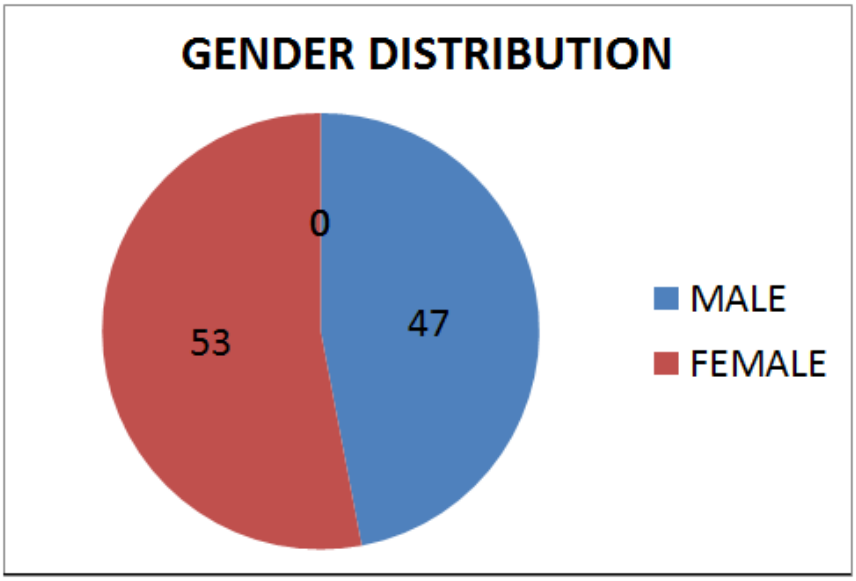
Exclusion Criteria:

1. Age less than 15 years or more than 60 years.
2. Preexisting substantial chronic liver, kidney or heart disease.
3. Patients with history of hematological disorders.
4. Diagnosis of Malaria, Enteric fever.

Data Analysis: Data collected will be analyzed by frequency, percentage, mean, standard deviation (S.D), paired 'f' test, chi-square tests.

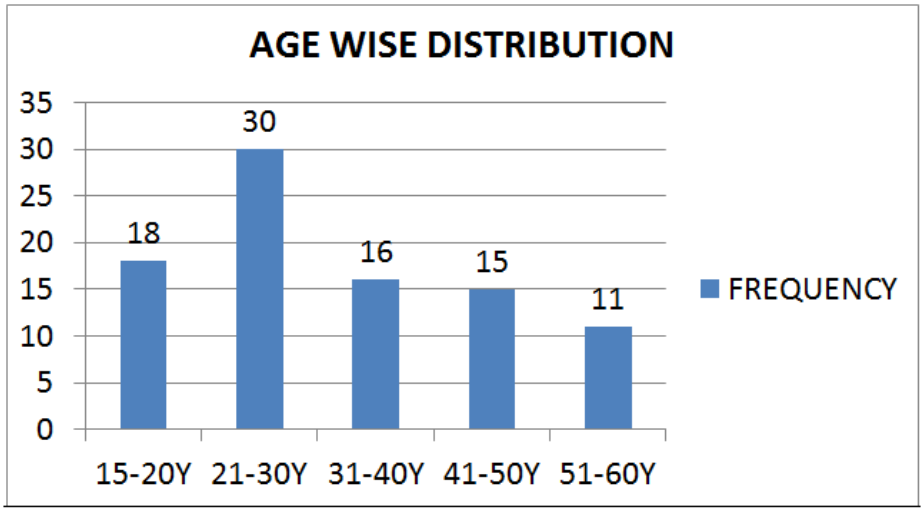
RESULTS:

I. GENDER DISTRIBUTION:



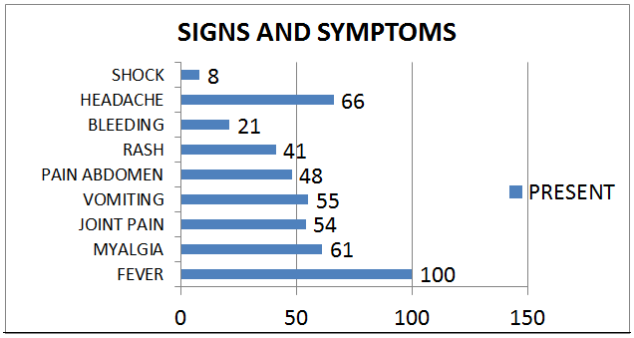
The study included 47 males and 53 females.

II. AGE WISE DISTRIBUTION:



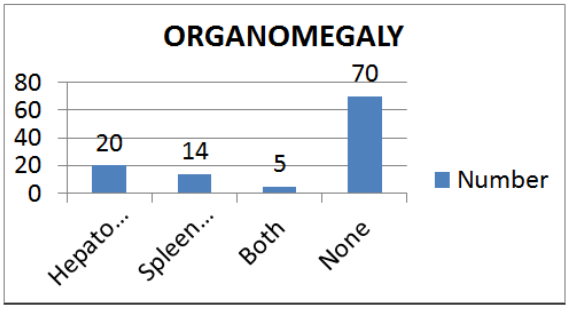
From this graph it was observed that maximum cases were from the age group 21-30 year group 30 in number, as dengue is seen more in younger age group. The least were seen in the older age group 51-60yr.

III. ANALYSIS OF SIGNS AND SYMPTOMS:



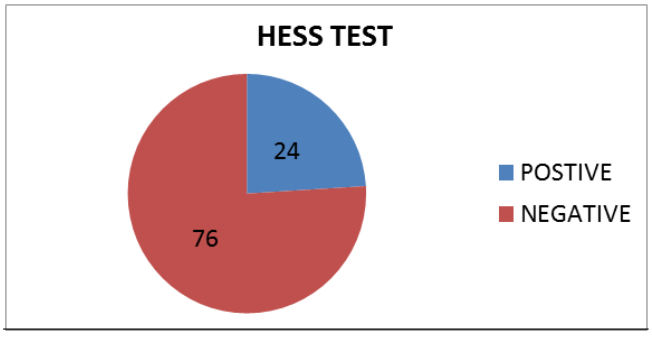
The graph shows that all patients presented with fever (100%) and the most common symptom patients presented was headache (66%), vomiting (55%), joint pain(54%), the least common sign was shock (8%).

IV. ORGANOMEGALY:



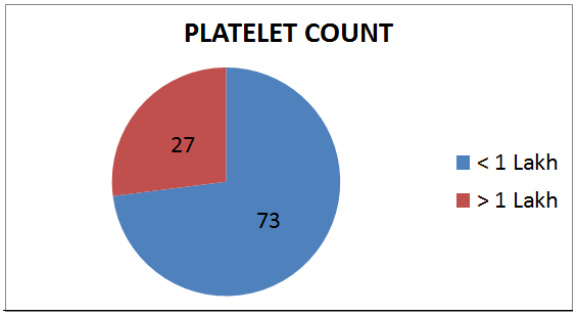
The graph shows the organomegaly was seen in 30 percent of the patient. Hepatomegaly observed in 20 patient and spleenomegaly in 14 patient and 5 patients had hepatospleenomegaly.

V. HESS TEST:



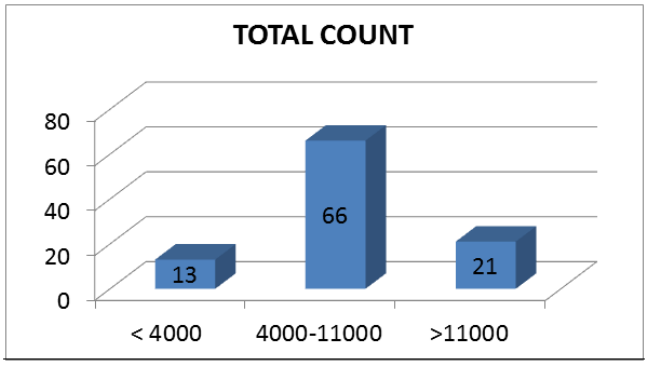
The study shows that 24 patients had a positive Hess test and 76 patients had a negative test. Hess test did not co relate with thrombocytopenia. As the observed thrombocytopenia was seen in 73 patients but not all of them had Hess test positive.

VI. PLATELET COUNT:



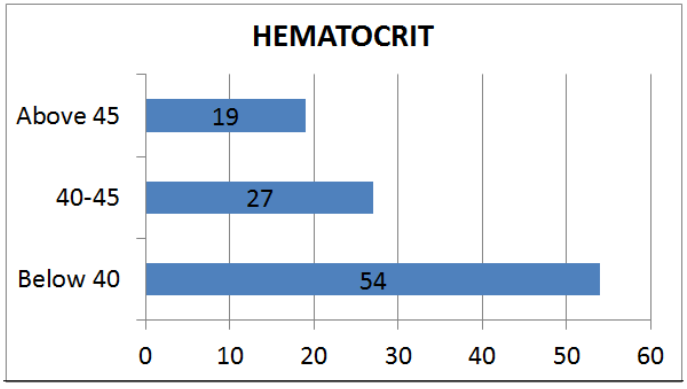
This study showed that 73 percent of patients had thrombocytopenia as per WHO criteria (< 1 lakh).

VII. TOTAL LEUKOCYTE COUNT:



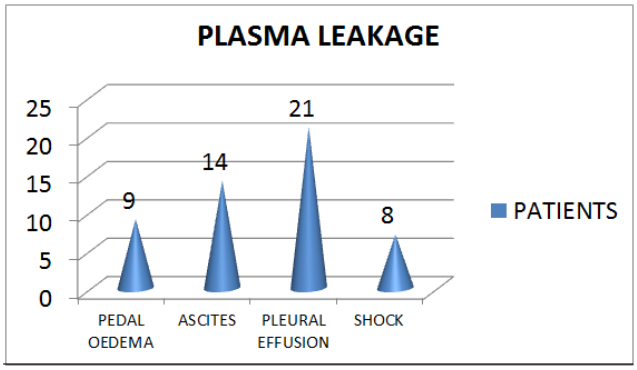
This graph shows that most of the patients (66) had a total count of 4000-11000 cells/mm3. Leukocytosis was seen in 21 patients and leukopenia was seen in only 13 patients.

VIII. HEMATOCRIT VALUES



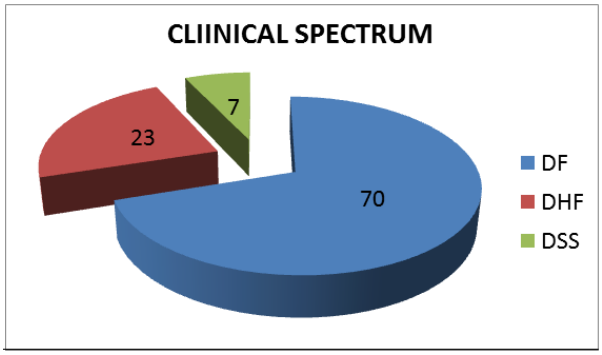
The hematocrit below 40 group had maximum patients 54 in number and only 19 patients had >45 hematocrit.

IX. PLASMA LEAKAGE:



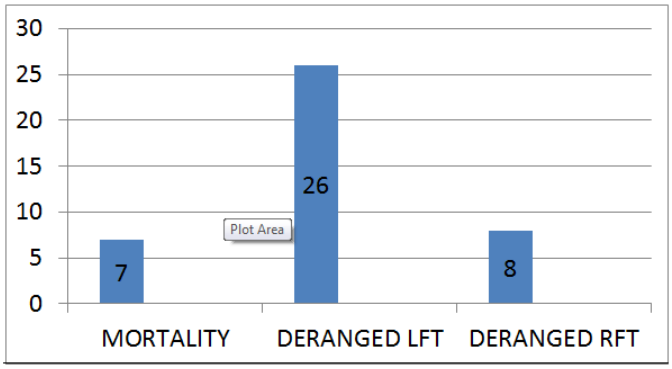
This study showed the evidence of plasma leakage in terms of pleural effusion seen in 21 patients, and ascites seen in 14 patients. Pedal edema and shock were seen in 9 and 8 patients respectively.

X. CLINICAL SPECTRUM OF DENGUE CASES:



This study showed that most of the patients in this study come under the clinical diagnosis of Dengue Fever (70%), and DHF (23%) and DSS (7%).

XI. OTHER PARAMETERS:



This study shows that 26 patients had an abnormal LFT and 8 patients abnormal RFT, with a mortality of 7 patients. The average duration of hospital stay is 4.65 days.

DISCUSSION: Dengue fever has become a major global public health problem. In India, epidemics are becoming more frequent. Classical dengue fever is an acute febrile illness but in a small percentage of dengue infection, a more severe form of disease known as DHF occurs. Early recognition and meticulous management are very important to save precious lives from this killer disease.

A total of 100 patients admitted to our hospital with fever of $>101^0$F and IgM Dengue positive were studied.

SEX DISTRIBUTION:

Sl. No.	Author	Year	Place	M:F
1	Kamal et al[7]	2002	Warangal	0.72:1
2	Dask PK et al [8]	2003	Gwalior	1.28:1
3	Neerja M et al [9]	2004	Hyderabad	2:1
4	Nandini et al [10]	2013	Kolkota	1.01:1
5	Present study	2013	Gulbarga	0.98:1

Table No. 1: Comparison of sex distribution with other studies

The present study included 53 females and 47 male patients. Male to female ratio was 0.98:1.This was corresponding to the other studies by Dash PK et aland Neerja M et ali.e., 1.28:1, 2:1 respectively.

CLINICAL PROFILE OF THE DISEASE:

Sl. No.	Author	Year	Place	Clinical profile
1	Pancharoen et al[11]	1995	Thailand	DF: 22.3% DHF: 60.4% DSS: 17.3%
2	NeerjaM et al[9]	2004	Hyderabad	DF: 85% DHF: 5% DSS: 10%
3	Nandini et al[10]	2013	kolkota	DF: 71% DHF/DSS: 29%
4	Present study	2013	Gulbarga	DF: 70% DHF:23% DSS: 7%

Table No. 2: Comparing incidence of each clinical spectrum in various studies

In the present study, Dengue fever was seen in 70% of the study population. The incidence of DHF and DSS was 23%and 7%respectively. In a study done by Neerja M et althe prevalence of DF, DHF, DSS was 85%, 5%, 10% respectively. In a study done by Pancharoen et al there was high incidence of DHF i.e., 60.4%. The results of the present study corresponds to a study by Neerja M etal. From these observations, we can conclude that the incidence of each clinical spectrum varies with geographical area. The area where we have conducted the study is not a known endemic area for dengue fever.

ANALYSIS OF VARIOUS SYMPTOMS (%):

Sl. No.	Study	Fever	Joint pains	Myalgia	Headache	Rashes	Bleeding	Others
1	Aggarwal et al[12] 1996	93	-	-	-	-	-	19
2	Dash PK et al[8] 2003	100	55	70	86	56		10
3	Neerja M et al[9] 2004	100	15	53	74	41	7	12
4	Khan E et al[13] 2006	98.3	-	23.8	7.5	37.8	-	8.3
5	Nandini et al 2013[10]	97.8	-	90	86	28	2	17
6	Present study 2013	100	54	61	66	41	21	20

Table No. 3: Comparing various symptoms with other study

FEVER: Fever was the presenting complaints in all cases in my study. In the study conducted by Agarwal et al, Dash PK et al, Neerja et al, Khan et al, fever was present in 93%, 100%, 100%, 98.3% respectively.

OTHER SYMPTOMS: Myalgia and joint pains were seen in 61% and 54% cases respectively. In the study conducted by Dash PK et al, Neerja et al, Khan et alMyalgia was present in 70%, 53%, 23.8% respectively. Joint pain was found in 55% and 15% of patients in study done by Dash PK et al and Neerja M et al.

It was noted that headache was seen in 86% of patients in our study. Similar incidence was present in other studies too. In the study conducted by Dash PK et al, Neerja et al, Khan et al headache was present in 85%, 74%, 75% respectively.

Rash was one of the presenting complaint seen in 41% patients. In the study conducted by Dash PK et al, Neerja et al, Khan et alrash was found to be present in 56%, 41%, 37.8% respectively.

Bleeding was a presenting complaint in 7% of patients in the study conducted by Neerja et aland the percentage of bleeding was found to be higher i.e. 21% in our study.

Vomiting and pain abdomen was found in 55% and 48% of patients respectively. The incidence of this was not mentioned in other studies.

The findings in the present study correlated with studies done by Dash P K et al, Neerja et al and Khan et al.

THROMBOCYTOPENIA:

No.	Author	Year	Place	Platelet
1	Cherian T et al[14]	1990	Hyderabad	94.7%
2	Singh NP [15]	2003	Delhi	61.39%
3	Khan E et al[13]	2006	Thailand	81.4%
4	Nandini et al[10]	2013	kolkota	55.6%
5	Present study	2013	Gulbarga	85%

Table No. 4: Comparison of thrombocytopenia with other studies

In present study, 85% patients had thrombocytopenia. The association of thrombocytopenia with dengue virus infection has been proved to be significant ($p < 0.001$). Studies by Cherian T et al, Singh N P et aland Khan E et alshowed the incidence of thrombocytopenia in 94.7%, 61.39%, 81.4% respectively. This correlated with the above mentioned studies.

SHOCK:

Sl. No.	Study	place	Shock
1	Nimmanitya et al[16]	SEAR	35%
2	Nandini et al[10]	Kolkota	11.5
3	Present study	Gulbarga	8%

Table No. 5: Comparison of shock with other study

Present study showed features of shock in 8% patients.Study conducted by Nimmanitya et al[16]showed the incidence of shock in 35% and the study done by Nandini et al showed 11.5 % shock. From these observations, we can conclude that the incidence of each clinical spectrum varies with geographical area.

TOURNIQUET TEST/ HESS TEST:

Sl. No.	Study	Place	Percent
1	Nimmanitya et al 16	SEAR	83.9%
2	Kabra et al[17]	New Delhi	40%
3	Gomber et al [18]	New Delhi	25%
4	Nandini et al[10]	kolkota	31%
5	Present study	Gulbarga	24%

Table No. 6: Comparision of tourniquet test with other studies

Platelet count and tourniquet test did not consistently correlate with each other. Tourniquet test was positive in 24% patients. Other studies have noted varying results in this test. Tourniquet test is not a reliable test for diagnosis as observed in many other Indian studies.

HEPATOMEGALY:

Sl. No.	Study	Place	Year	Hepatomegaly
1	Nimmannitya.S et al[16]	SEAR	2000	90%
2	Mohan et al [19]	New Delhi	2000	74%
3	Aggarwal et al[12]	Chennai	1996	90%
4	Nandini et al[10]	Kolkota	2013	22%
5	Present study	Gulbarga	2013	20%

Table No. 7: Comparison of hepatomegaly with other studies

The present study showed hepatomegaly in 20% of patients. Study conducted by Aggarwal et alNeerja et al, Nimmanitya et al, Mohan et al, showed incidence of hepatomegaly in 90%, 74%, 71% and 72% patients respectively.

HAEMATOCRIT: In the present study, a comparison was done between the platelet count and the presence of bleeding. Bleeding manifestations were seen more in patients with thrombocytopenia than with patients of normal platelet count. The hematocrit ranged from 32 - 60%.The mean hematocrit value of dengue positive cases in my study was 40.7%. In DHF and DSS, an increase in hematocrit levels was noted. This correlated as per the WHO guidelines

FEATURES OF FLUID LEAKAGE: Out of 100 patients in the study, 21 % patients showed evidence of pleural effusion, 9% patients were found to have pedal edema, 14% patients were found to have ascites. This correlated with the studies done by Neerja et al and Dash P K et al. As per WHO guidelinespedal edema, ascites and pleural effusion are the supporting evidence of plasma leakage, the distinguishing feature of DHF.

MORTALITY RATE: The study done by Nandini et al in kolkota showed a case fatality rate came out to be 3.8%., where as in my study the fatality was 7 in number. All these patients had presented very late to the hospital and hence the delay in management.

CONCLUSION:

- The present study had an objective of studying clinical manifestations and hematological profile associated with dengue fever.
- Bleeding tendencies should be closely watched for. When features of plasma leakage such as pedal edema, pleural effusion, ascites, are present, patient should be closely watched for and should be immediately managed.
- A positive Hess test should prompt close observation and early hospital referral, but a negative test does not exclude dengue infection.

- The treatment of dengue is mainly supportive. However appropriate fluid management plays a major role in outcome of the disease.
- Dengue serosurveillance studies may give some idea about advent, intensity, transmission season, seasonal incidence, waxing and waning, and impending epidemic of dengue and DHF. A large-scale active longitudinal serosurvey along with the study of vector capacity and vector competence would provide more correct information.

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