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Original Research Article

A Study of Clinical and Laboratory Profile of Dengue Fever in a Tertiary Care Centre

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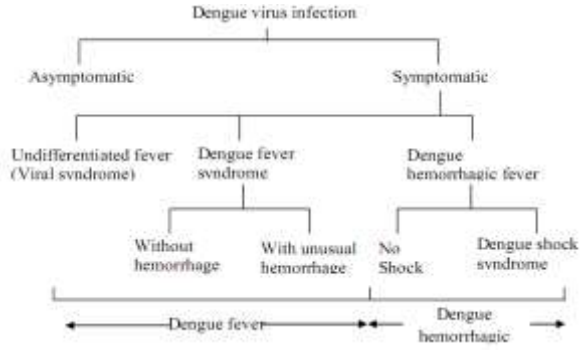
Abstract: Dengue is the most important viral infection transmitted by mosquitoes to humans in terms of both illness and death. Outbreaks of dengue fever have been reported quite frequently from different parts of the country. It is important to recognize and differentiate the clinical signs and symptoms, alterations in the biochemical parameters and the multi system involvement pattern in Dengue Fever. The current study analyses the varying clinical presentation and laboratory parameters of Dengue Fever and the various factors affecting the prognosis thus helping in early diagnosis and better management of the disease.40 cases of confirmed dengue infection admitted to District Hospital, Gadag were studied. A detailed clinical history and physical examination was done and baseline investigations were asked. These cases were stratified based on the presence or absence of complications like shock and haemorrhage. The frequency of various signs and symptoms and the values of laboratory tests were compared.DF was seen in 29(72.5%),DHF in 8(20%) and DSS in 3(7.5%) patients. Maximum number of patients was seen in the month of July, August and September. Platelet count was not very well correlated with the bleeding tendencies. The frequency of complications was high in the patients with secondary dengue infection than the primary infection. Dengue IgG Ab positivity (secondary dengue) appears to be a bad prognostic indicator and was associated with more complications.This study helps in better understanding of the disease thus helping in the better management of the cases.
Keywords: Dengue haemorrhagic fever; Thrombocytopenia; Bleeding manifestations; Platelets; Haemoconcentration.

INTRODUCTION

The term Dengue was introduced into English Medical Literature from Spanish West Indies during 1827 and 1828 Carribean Epidemic of an exanthem with arthralgia. Dengue is a Spanish homonym for the Swahili 'Ki dengaPepo' (A sudden cramp like seizure caused by an evil spirit) [1, 2]. It is also suggested that the word dengue derived it's origin from denga or dyengo which in Africa means hemorrhage.Dengue is the most important viral infection transmitted by mosquitoes to humans in terms of both illness and death [3].The exact date when Dengue fever was first recognized in the world is still obscure. The first definite clinical report of Dengue is attributed to Benjamin Rush in 1789 [4].Some 2500 million people - two fifths of the world's population are now at risk from dengue. WHO currently estimates there may be 50 million cases of dengue infection worldwide every year? The first recorded outbreak of Dengue fever in India was in 1812, but serological surveys were first carried out in 1954, which indicated that DEN-1 and DEN-2 were widespread. In 1960, DEN-4 was isolated in Vellore[5].Outbreaks of dengue fever have been reported quite frequently from different parts of the country. According to WHO report, the mortality in untreated cases of Dengue Fever was reported to be as high as 20%, while the hospitalized patients had a mortality rate of less than 1% [6].

Dengue is caused by a RNA virus belonging to the Flavivirus group possesses antigens that overlaps with yellow fever, Japanese encephalitis & West Nile fever viruses. It comprises of four closely related yet serologically distinct viruses called DEN-1, DEN-2, DEN-3, DEN-4. Dengue is transmitted by *Aedesaegypti*, first described by Bancroft in 1906, was later proved by Siler et al and Simmons et al. The known natural hosts for Dengue virus are man, lower primates, and mosquitoes [6].

Manifestations



It is vital to recognise and differentiate the clinical signs and symptoms, alteration in the biochemical parameters and the multi-system involvement pattern in Dengue Fever for early diagnosis and appropriate intensive supportive therapy.

This study has been undertaken to know the commonest modes of Clinical presentation in patients with dengue infections in our hospital and to correlate these Clinical features with the laboratory findings, which May help us in early diagnosis of the cases and management.

EXPERIMENTAL SECTION-MATERIAL AND METHODS

Source of Data:

All the adult patients with suspected Dengue Fever admitted to medical wards in District Hospital, Gadag.

Method of collection of data:

The data for this study was collected by patient evaluation which was done by detailed history taking, clinical examination and relevant investigations. Informed consent was taken from all subjects.

Sample size : 40
Study design : A prospective clinical study

Inclusion criteria:

All the adult patients with Clinical features suggestive of Dengue infection, later on confirmed by serology were included in this study.

Exclusion criteria:

Dengue fevers with any other identified specific infection were excluded from the study.

METHODOLOGY

64 patients, identified as probable cases by clinical suspicion, admitted to District Hospital, Gadag, were registered in the study. The case definition was based on compatible history and examination based on WHO criteria, confirmed by Dengue serology. A detailed demographic data, clinical history, physical examination and relevant baseline investigations were done. Patients with an identified bacterial focus or any other identified specific infection were excluded during the study.

For all cases, the rapid IgM- capture ELISA test (MRL diagnostics), which has become the gold standard for the serological diagnosis of dengue fever was done. Serum samples were obtained on an average of 5 to 7 days after DF symptoms had appeared. Ig-G antibodies were detected by microplate ELISA technique (MRL diagnostics).For both assays optical density readings at 450 nm were compared with reference cutoff readings to determine positivity. The procedure was performed per the manufacturer's instructions and took 4 h to complete.

The number of cases included in the study, based on the above criteria, was 40. The cases were followed-up daily for the clinical and laboratory parameters.

The patients were treated with IV fluids, paracetamol, antacids, blood products and inotropics as per WHO criteria for treatment of dengue. These cases were stratified based on the presence or absence of complications like shock and haemorrhage in to various dengue types. The frequency of various signs and symptoms and the values of laboratory tests were compared.

INVESTIGATIONS: The Study requires the following investigations

- Complete haemogram
- Platelet Count
- Liver function test
- Blood urea
- Serum Creatinine
- Chest X-ray
- Ultrasound abdomen
- Coagulation profile
- ECG
- Dengue antibodies – lg M &lg G by Capture ELISA

Statiatical analysis:

The collective data as well as the proportions and percentages of variables are projected by appropriate charts, tables and graphs. As there is no comparative study involved, no significant statistical methods were applied

RESULTS AND DISCUSSION

Our study included 40 adult patients of serologically confirmed dengue fever who were admitted to District Hospital Gadag. Highest number of

cases were seen in the months of August (32.50%), July (22.5%) and September(15%) that corresponds to post monsoon season. Md. Ayyub et al reported similar results in their study where overall incidence of infection in these months was 33.6% [7].

Mean age of the patients was 36 years. Maximum numbers of patients were in the age group of 21-30 years (32.50%) and minimum were in the age group of 60 and more years. Patients below the age of 15 years and above 65 years were excluded from the study. There were 22(55%) females and 18(45%)males. Highest numbers of female patients were in the age group of 31-40 years and males were in the age group of 21-30 years.

Most common presenting features were fever (100%) followed by myalgia (82.5%), headache (75%), fatigue (55%), arthralgia (55%). Least common presenting features were malena (2.5%) and seizure (2.5%).Similar results were observed in a study conducted by G.N. Malavige et al in Sri lanka [10],where fever was found in 100%, myalgia in 78.5%, headache in 78% and arthralgia in 56.7%. Similar results were also observed in a study conducted by Agarwal A. Chandra J et al [8], Kabra SK et al. [9]

Among our patients, 5% of the patients had pallor. Icterus was seen in 22.5% of patients, pedal edema in 15%, lymphadenopathy in 10% of the patients. Pulse rate was 90±25. Hypotension was present in 3 (07.50%) of the patients.

Tourniquet test was positive in 11 (27.5%) of the patients out of which 9 had spontaneous bleeding manifestations. other two patients had bleeding tendencies that was revealed only with the tourniquet test. A study conducted by G.N.Malavige et al in Sri lanka[10] the test was positive in 33.7% of the patients. The test was positive more commonly among younger patients in both these studies.

Right hypochondriac tenderness was the predominant finding (25%) in abdominal examination followed by, spleenomegaly (17.50%), hepatomegaly (15%) and ascites (07.50%).These results were correlated well with a study conducted by Krishnamurthy .K et al in Vishakhapatnam in 1965 [11], where in his study hepato-megaly, spleenomegaly were present in 16.5% and 19% of the patients respectively.

Respiratory system examination revealed evidence of pleural effusion in 32.5% of the patients out of which majority had bilateral pleural effusion. CXR examination revealed pleural effusion in only 25% of the patients indicating minimal effusion. One patient had nonspecific finding in the form of non-homogenous opacity in the right para cardiac region. Cardiovascular system examination was normal except for evidence of hypotension in 3 patients.Central nervous system examination was normal except for altered sensorium in 2 patients.

Evidence of hemoconcentration as indicated by raised Hb% (>16gm%) and HCT(>45%) was seen in 22.5% and 20% of the patients respectively. Similar results were observed in a study conducted by G.N. Malavige et al [10], but there was raise in Hb% in only 6% of the patients in a study by Rachel Daniel et al in Kerala. This disparity can be explained by either an underlying anemia or nutritional imbalance.

Mean platelet count was 55000/cmm. Platelet count at the time of admission was below 10000 in 7.5% of the patients and above 100000 in 22.5% of the patients. 2 patients with platelet count less than 10000 had spontaneous bleeding and 1 patient with platelet count more than 100000 had bleeding tendency. The bleeding manifestations were not very well correlated with the platelet count. Similar results were observed in a study conducted by S.Sharma et al during an outbreak of dengue fever in Delhi in 1996. Average platelet count at the time of discharge was 127000. Abnormal coagulation profile was seen in 2 (5%) patients.

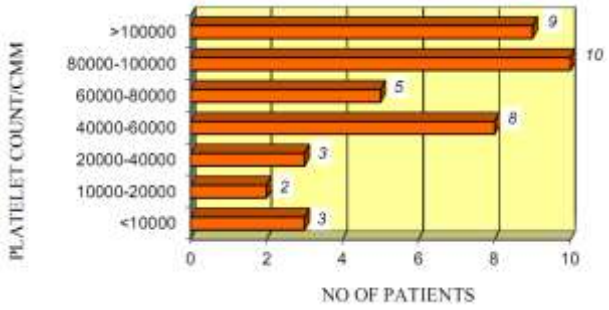


Fig. 1: Platelet count in study population

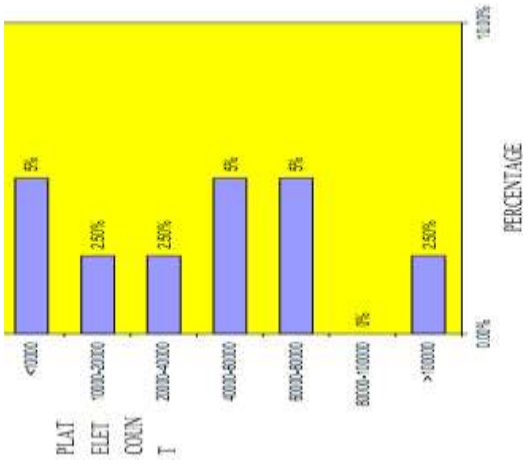


Fig. 2: Bleeding manifestations depending on platelet count

Most common LFT abnormality was raised SGOT that was seen in 55% of the patients. TB was raised in 22.50%, hypoalbuminemia was seen in 15% of the patients. Elevated blood urea and serum creatinine were seen in 15% of the patients. Similar results were observed in a study conducted by Ibrahim N.M et al [12]and Pancharoen C et al [13].

The most striking USG-Abdomen finding in our study population was GB wall thickening/edema that was seen in 42.50% of the patients. Spleenomegaly (30%), hepatomegaly and ascites(15%) were also seen.2D Echo revealed pericardial effusion in 5% of the patients. MVP as an incidental finding was seen in 1 patient.

Body fluid analysis revealed mild lymphocytic leukocytosis with normal proteins and sugar levels and was negative for organisms. This analysis may helpful to diagnose other infections causing pleural effusion or CNS infection.

45% of the patients are positive for IgM anti dengue antibodies and 55% are positive for both IgM and IgG antibodies. This indicates that secondary dengue infection was more compared to the primary dengue infection. . Dengue IgG Ab positivity appears to be a bad prognostic indicator. The titres of the antibodies were high in patients with secondary dengue infection and in those with severe disease. Similar results were observed in a study conducted by David W Vaughan et al [14]

Table1:Dengue serology –Capture ELISA

Dengue antibody	No. of pts	Percentage (%)
IgM	18	45.00
IgM& IgG	22	55.00

45% of the patients are positive for IgM anti dengue antibodies and 55% were positive for both IgM and IgG antibodies.

Overall dengue infection was more common in females (52.50%) than in males (47.50%). Out of 40 cases of dengue, 29 cases (72.50%) were classified as DF, 8 cases (20%) as DHF and 3 cases (07.50%) as DSS. Highest number of DF cases was seen in the age group of 21-40 years. DHF was more common in the age group of 21-30 years (4 cases) followed by in the age group of 15-20 years (3 cases).This indicates that DHF was more common in the younger individuals. Incidence of DHF was more with secondary Dengue infection (5 cases) than the primary dengue infection(3 cases). Similar results reported from WHO [15].

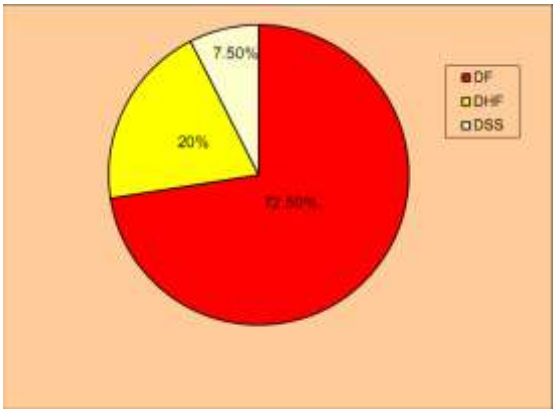


Fig. 3: Disease manifestation in study population

All the patients' received IVF. Antibiotics were given to 90% of the patients, Platelet transfusion to 20%, Steroids in 10% of the patients. 5% of the patients required inotropic support.

Among 40 patients admitted, 18(45%) patients had no complications and had an uneventful hospital stay. 22(55%) patients had systemic complications. Hepatic, Renal and Multi organ involvement was observed in 55%, 15% and 15% of the patients respectively. The frequency of complications was high in the patients with secondary dengue infection than the primary infection. Similar results were observed in a study conducted by Halstead SB et al [16] No deaths occurred in our study population.

Mean duration of hospital stay was 6 days. 12.5% of the patients required hospital admission for more than 10 days. The duration of hospital stay was more in patients with secondary dengue infection.

CONCLUSION

- In our study, the commonest clinical presentation was of Classical dengue fever (72.5%) followed by Dengue hemorrhagic fever(20%) and Dengue shock syndrome(7.5%).

  Most common presenting symptoms were Fever, Myalgia, Headache, retroorbital pain. Least common presenting symptoms were Seizure, malena. Thrombocytopenia, LFT abnormalities and evidence of polyserositis were common laboratory findings and were correlated very well with the disease symptoms.
- Incidence of DHF/DSS and other complications were more with secondary dengue infection than the primary dengue

infection. These complications were high in younger age group than elderly population.

- Early diagnosis of the cases and better management will help in reducing morbidity and mortality associated with Dengue infection.

LIST OF ABREVIATIONS

Alb →Albumin
ALK →Alkaline Phosphatase
APTT →Activated Partial Thromboplastin Time
ARF →Acute Renal Failure
BT →Bleeding Time
CT →Clotting Time
CNS →Central Nervous System
CxR →Chest x-ray
CVS →Cardiovascular System
DF →Dengue Fever
D.O.D →Date of Discharge
D.O.A →Date of Admission
DBP →Diastolic Blood Pressure
DHF →Dengue Haemorrhagic Fever
DSS →Dengue Shock Syndrome
ECG →Electro Cardiography
ELISA →Enzyme Linked Immuno-Sorbent Assay
FDP →Fibrin Degradation Products
FFP →Fresh Frozen Plasma
GBS →GuillainBarre Syndrome
Hb →Haemoglobin
HCT →Haematocrit
Ig →Immunoglobulin
LFT →Liver Function Tests
MODS →Multi-Organ Dysfunction Syndrome
NSAIDs →Non-Steroidal Anti-Inflammatory Drugs
PA →Per-Abdomen
PCV →Packed Cell Volume
PT →Prothrombin Time
RNA →Riboxy Nucleic Acid
RFT → Renal Function Tests
RS →Respiratory System
SBP →Systolic Blood Pressure
SGOT →Serum Glutamate Oxaloacetate Transaminase
SGPT →Serum Glutamate Pyruvate Transaminase
TC →Total Count
USG →Ultra Sonography
W.H.O →World Health Organization
TB →Total Bilirubin

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