

Evaluation of Clinico-Hematological and Biochemical Changes in Dengue Fever at CIMSH Lucknow

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ABSTRACT

Introduction: Among the mosquito borne viral infections. Dengue fever is not only major health problem in Indian subcontinent but it has become a major global health concern. Objective of study was to evaluation of clinico-hematological and biochemical changes in dengue fever at CIMSH Lucknow

Material and Methods: Clinically suspected cases of dengue fever, were confirmed by immunological test which consists of dengue NS1 antigen and IgM antibody. during the period from August to December 2016. A total of 100 seropositive dengue cases were correlated with clinical features, hematological, and biochemical findings. The relevant data was analyzed using STAT a software version 2.0

Result: Males were 59 (59%) and females were 41(41%). The age ranged from 18-70 years with mean age of 30.4±11.4 years. Most common clinical features were high grade fever (90%), body ache (90%), purpuric rash (85%), headache (80%), restlessness (80%), Anorexia (70%) and general weakness (68%) (Table 4). The main hematological findings were raised hematocrit (27%) (Table 3), leukopenia (50%), and thrombocytopenia (89%) (Table 2). Alteration in liver function like: rise in SGPT (60%), SGOT (74%), serum alkaline phosphatase (9%) and serum bilirubin in 4% of cases (Table 2). According to WHO criteria 81% patient fall under dengue Fever (DF) category while 15% and 4% patient fall in Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) category (Table1).

Conclusion: Fever, body ache, purpuric rashes, headache, restlessness, anorexia and generalized weakness along with leukopenia, thrombocytopenia, raised SGPT, SGOT, hematocrit gives enough clues to test for dengue serology to confirm dengue fever. So early therapeutic measures should be initiated to reduce the morbidity and mortality.

Keywords: Dengue Fever, Dengue Hemorrhagic Fever, Dengue Shock Syndrome, Leukopenia, Thrombocytopenia, Liver Function

INTRODUCTION

DF is an important mosquito borne acute febrile illness.¹ It is also known as “break bone fever”.¹ It is caused by RNA virus which belongs to Flavi viridae family.¹ It is transmitted by bite of Aedes aegypti mosquito during the day.² Four serological subtypes: DEN-1, DEN-2, DEN-3 and DEN-4 of Dengue virus have been reported.³

WHO estimated 50-100 million Dengue infections and 2-5 lac DHF occur yearly Worldwide and mortality rate is around 5%.⁴

The epidemic trend in India is at rise with increasing mortality.⁵ Dengue fever shows a cyclical trend with a peak

in September-October every year. It is spread by female Aedes mosquito which breeds exclusively in domestic man made water reservoirs like cooler, water tanks etc.

The aim of study was to evaluate clinic-hematological and biochemical changes in Dengue Fever at CIMSH during outbreak in 2016.

MATERIAL AND METHODS

This is prospective descriptive analytical study carried out at CIMSH during the outbreak of Dengue fever at Lucknow from August to December 2016. One hundred NS1 positive Dengue cases were included in the study. Ethical clearance was obtained from college ethical committee and informed consent was taken from patient. These cases were divided into 3 groups i.e. DF, DHF and DSS as per the definition of World Health Organisation(WHO)⁶⁻⁸ DF is defined as high fever, fever with rash, retro-orbital pain, myalgia, arthralgia, and conjunctival congestion. DHF is defined as continuous high grade fever (lasting 2 to 7 days), hemorrhagic tendency positive tourniquet test, petechiae, or epistaxis), decrease platelet counts (<100,000/cumm) and evidence of plasma leakage manifested by hemoconcentration, pleural effusion, and ascites. Diagnosis of DSS is made by profound features of shock in the form of thready rapid pulse and profound hypotension .

Data's regarding seropositive DF (dengue NS1 antigen and IgG, IgM) using rapid Dengue Day1 test(rapid visual card test) from J Mitra and company private limited, Delhi, India were taken from department of microbiology . Hematological profiles and biochemical investigations of seropositive dengue cases were carried out at the time of admission and were correlated.

Laboratory hematological analysis included complete

Diagnosis	Number of patients	Percentage(%)
DF	81	81
DHF	15	15
DSS	04	04
Total	100	100

Table-1: Distribution of patients of DF according to WHO criteria (N=100)

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	TLC (cells/Cumm)		Platelet count (cells/Cumm)		Liver function		
	<4,000	4,000-11,000	<20,000	20,000- <1,00,000	SGPT (>40IU/L)	SGOT (>35iu/L)	SB >1.2 mg%
No. of patients	50	50	38	62	60	74	Nil
Percentage(%)	50%	50%	38%	62%	60%	74%	Nil

Table-2: Total leukocyte count (TLC), platelet count and liver function test in patient with DF (N=100)

Hemoglobin (gm/dL)	No. of patients			
	Male	Female	Total	Percentage (%)
<7	02	Nil	02	2%
7-11	05	13	18	18%
11-16	47	28	75	75%
>16	05	Nil	05	5%
Total	59	41	100	100%

Table-3: Hemoconcentration in patients with DF (N=100)

Clinical presentation	No. of cases (N=100)	Percentage(%)
Symptoms		
Fever	99	99%
Body ache	90	90%
Headache	80	80%
Restlessness	80	80%
Anorexia	70	70%
General weakness	68	68%
Abdominal pain	35	35%
Nausea	25	25%
Diarrhea	20	20%
Vomiting	10	10%
Breathlessness	05	05%
Melena	04	04%
Epistaxis	01	01%
Hematemesis	02	02%
Hemoptysis	10	10%
Signs		
Purpura	85	85%
Petechiae	06	06%
Hypotension	04	04%

Table-4: Frequency of symptoms and sign in patients with DF

haemogram with cell counter machine (Mindraj) and peripheral blood smear was evaluated. Raised hemoglobin or red blood corpuscles is considered as hemoconcentration. Leukopenia was defined as less than 4,000/cumm and thrombocytopenia as less than 1.0 lakh/cumm. Liver function tests (and serum bilirubin) were done using Jendrassik modified method (FAR, Italy) as a part of fever profile. Derangement in liver function test was considered if SGPT value >55 IU/L and serum bilirubin value >1.2 mg/dL.

STATISTICAL ANALYSIS

Relevant data's were collected and analyzed using STAT a software version 2.0

RESULTS

A total 100 patients were studied comprising of 59(59%) males and 41 (41%) females. Of 100 cases 30(30%) were from rural area and 70 (70%) cases were from urban area. Age ranged from 18-70 years with mean age of 30.4 ±11.4

years. The frequency of Dengue Shock Syndrome in our study was 4% which is higher than reported in the different literature (0.5-2%) (Table 1). Leucopenia was observed in 50% Of the cases in the present study (Table 2,3). The most frequent symptoms were observed in their decreasing order of frequency, fever, body ache, backache, headache, rashes, restlessness, anorexia abdominal pain, nausea while the most frequent sign was petechiae (Table 4)

DISCUSSION

Dengue infection more frequently spread among urban areas with poor drainage facilities along with poor drainage conditions and causes outbreak.⁹

The most frequent symptoms were observed in their decreasing order of frequency, fever, body ache, backache, headache, rashes, restlessness, anorexia abdominal pain, nausea while the most frequent sign was petechiae (Table 4). These finding were similar as reported in previous studies.⁹⁻¹³ The frequency of Dengue Shock Syndrome in our study was 4% which is higher than reported in the different literature (0.5-2%) (Table 1). It has been reported that hospitals with highly trained staff and resources have reduced the incidence of Dengue shock syndrome to less than 0.3%.^{14,15}

Death in dengue fever is mostly due to hemorrhagic manifestations, fluid transudation and Dengue shock syndrome. Published report regarding mortality in DHF and DSS is about 5%.¹⁶ Present study observed 2% mortality in DHF and DSS. This is slightly lower than described in international literature. This may be because of number of cases in these group were less.

Pedal edema, pleural effusion and ascites is feature fluid sequestration. The reason may be due to increase vascular permeability. Its true incidence varies. In western literature, it is shown to be about 34%.¹⁷ The present finding is 14% which is in sharp contrast to the previous observation (Table 4). The reason for this contrast could not be found. But the different Dengue virus serotypes may be the cause.

Leucopenia with lymphocytosis and thrombocytopenia are associated with DF. The causes include bone marrow suppression and binding of dengue antigens to platelets and antibody mediated immunological destruction of platelets. Leucopenia was observed in 50% Of the cases in the present study (Table 2). This finding is similar to the previous studies.¹⁷⁻²⁰ Thrombocytopenia was observed in 89% of cases. There is more fall in platelet count in DHF and DSS as compared to DF. This finding is higher as compared to previous studies where thrombocytopenia was reported in 59% of cases.¹⁸⁻²¹

Rise in hematocrit is related to increase severity and it is caused by the increased plasma permeability which is the

main pathophysiological changes in DF. A 20% rise in hematocrit was considered as cut off for diagnosis of DHF. It indicates that intensive fluid therapy is required. In the present study the mean hematocrit rises were seen in 27% of cases which is similar to the finding of some author¹⁸ while it is less than the observation of the others¹⁹ which is 50% (Table 3).

Liver function test revealed raised SGPT in 64% of cases and raised SGOT in 74% while there was no rise in serum bilirubin in a single case (Table 2). The rise in SGPT and SGOT was similar to previous studies except bilirubin elevation.^{8,18,19}

CONCLUSION

Fever, body ache, purpuric rashes, headache, restlessness, anorexia and generalized weakness along with leukopenia, thrombocytopenia, raised SGPT, SGOT, hematocrit gives enough clues to test for dengue serology to confirm dengue fever. So early therapeutic measures should be initiated to reduce the morbidity and mortality.

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