Original Research Paper

Pediatrics

DENGUE FEVER: CLINICO-PATHOLOGICAL CORRELATION WITH SEROLOGICAL MARKERS AND PLATELET COUNT

Dr. Gunjan Jain*	MD Pediatrics (Senior Resident in NCH, Surat),Vesu, Surat – 395007. *Corresponding Author
Dr. Saloni Savani	MBBS (Sola Medical College, Ahemdabad).
Dr. Hardik Jain	3rd year MBBS (New Civil Hospital, Surat), Vesu, Surat – 395007.

ABSTRACT Dengue is an acute viral illness caused by RNA virus of the family Flaviviridae and spread by Aedes mosquitoes. Presenting features may range from asymptomatic fever to dreaded complications such as hemorrhagic fever and shock. A decreased number of white blood cells (leukopenia) accompanied by a decreased number of platelet count (thrombocytopenia) and metabolic acidosis are the initial changes on laboratory examinations. Microbiological laboratory testing confirms the diagnosis of Dengue Fever. Virus segregation in cell cultures, nucleic acid demonstration by polymerase chain reaction (PCR), and serological detection of viral antigens (such as NS1) or particular antibodies are the preferred microbiological assays. This study focuses on the importance of platelet counts and other platelet parameters in dengue infection. Also platelet counts are compared with clinical, radiological and other serological markers.

INTRODUCTION

Dengue the most important vector borne arboviral disease is a leading cause of morbidity and mortality throughout the tropics and subtropics. Dengue Viruses (DV) comes under family Flaviviridae. There are four serotypes of the virus distinguished on the basis of antigenicity; referred to as DENV-1, DENV-2, DENV-3 and DENV-4.[1] WHO Criteria for the diagnosis: [2]

A. **Dengue fever-** Classical dengue fever is an acute febrile viral disease frequently presenting with two or more of the following-headache, bone or joint pain, muscular pain, retro-orbital pain, rash & leucopenia.

B. **Dengue haemorrhagic fever-** All must be present:
1. Fever or recent history of acute fever.
2. Haemorrhagic manifestations
3. Thrombocytopenia (100,000/mm3 or less).
4. Evidence of plasma leakage due to increased capillary permeability manifested by one or more of the following:

>20% rise in haematocrit for age and sex.
>20% drop in haematocrit following treatment with fluids as compared to baseline.

Signs of plasma leakage (pleural effusion, ascites or hypoproteinemia)

C. **Dengue Shock Syndrome** -
Four criteria of Dengue Haemorrhagic Fever with signs of circulatory failure.

Various parameters are used for diagnosis like Platelet count, virus segregation in cell cultures, nucleic acid demonstration by polymerase chain reaction (PCR), and serological detection of viral antigens (such as NS1) or particular IgG/IgM Dengue antibodies are the preferred microbiological assays. [3]

The study focuses on the importance of platelet parameters in dengue infection. Significant difference was observed between severity of the thrombocytopenia and severity of the disease. Platelet count is thus a predictive parameter of DF/DHF/DSS. Low Mean Platelet Volume (<9fl) and high PDW (>13fl) are studied as a predictive marker for diagnosing severity of dengue fever.

AIMS & OBJECTIVES
1. To correlate the dengue serological markers with platelet count and other platelet parameters
2. Comparing severity of diseases with severity of thrombo cytopenia

METHOD
Study Area
This prospective study was undertaken in a tertiary hospital at Surat over a period of 12 months from June 2019 to May 2020. All patients less than 12 years with clinical features (according to WHO criteria) and serologically positive for dengue infection, were included in the present study.

Study Population :
INCLUSION CRITERIA:
All patients less than 12 years with clinical features and serologically positive dengue infection included.

EXCLUSION CRITERIA:
Patients above 12 years and which are serologically negative dengue and if routine laboratory test suggesting a bacterial, parasite or any viral infection other than dengue infection or any other disease.

The Statistical software namely SPSS 11.0 and Systat 8.0 were used for the analysis of the data

OBSERVATION:
Table1: Clinical Spectrum of Dengue Cases

Diagnosis	No.	%
Dengue fever (DF)	164	89.13
Dengue haemorrhagic fever (DHF)	18	9.78
Dengue shock syndrome (DSS)	2	1.08

Table 2: Correlation of Platelet count with Serological markers.

Platelet count (/cumm)	Serological positive cases
<100000	148 (80.43%)
>100000	36 (19.56%)

Table 3: Correlation between serological markers and thrombocytopenia

Dengue positive parameter	Total positive cases	No. of cases with Thrombocytopenia	%
NS1 antigen positive	132	117	88.6
IgM	98	80	81.6
IgG	24	5	20.83

Table 4: Correlation between Platelet count and Severity of disease

PLATELET COUNT(/cumm)	DENGUE FEVER (DF)	DENGUE HEMORRHAGIC FEVER (DHF)	DENGUE SHOCK SYNDROME (DSS)
<20,000	57	6	2
20,000-50,000	45	9	0
50,000-1 lac	26	3	0
>1 lac	36	0	0

Table 5: Mean Platelet volume (MPV) with severity of disease

MPV (fl)	DF		DHF		DSS	
	No.	%	No.	%	No.	%

<8	4	1.32	0	0.00	0	0
8-12	132	80.48	15	83.3	2	100
>12	28	17.07	3	16.6	0	0

Table 6: Platelet distribution width (PDW) with severity of disease

PDW (fl)	DF		DHF		DSS	
	No.	%	No.	%	No.	%
<9	0	0	0	0	0	0
9-14	151	92.07	16	88.8	2	100
>14	13	7.92	2	11.1	0	0

Table7: Platelet count at admission, during stay and at discharge

	At the time of admission	During stay	At the time of discharge
N	184	184	184
Mean±SD	42.18±18.765	64.34±20.851	102.79±27.644
Minimum	6,000/cumm	11,000/cumm	6,000/cumm
Maximum	118,000/cumm	1,23,000/cumm	2,44,000/cumm

DISCUSSION AND CONCLUSION

Total of 184 patients admitted to the hospital with the clinical features of dengue fever (according to WHO criteria) and serological positivity were studied. Most common clinical presentation of dengue were dengue fever (89.13%) followed by DHF (9.78 %) and least were DSS (1.08%). Males were higher in proportion as compared to females in Dengue (1.5:1) and DHF (1.6:1).

Fever was the presenting complaint in 98.59 % cases, next being vomiting (89.01%), athralgia (88.17%), while epistaxis (43.59%) and malena (56.41%) were commonly observed in DHF. Altered mental status and breathlessness were more observed in DSS cases. Radiologically hepatomegaly (8.73%) and pleural effusion (6.2%) were observed.

The finding of thrombocytopenia was almost a universal finding. All cases with severe thrombocytopenia and greater percentage of patients with moderate thrombocytopenia presented with complications of dengue (DHF/DSS) when compared to those with mild thrombocytopenia. Following the patients with necessary treatment, all cases of DF and DHF showed complete recovery with rise in platelets counts. Two cases of DSS succumbed to death with further fall in platelet counts. A significant association was thus noted between the clinical improvement or deterioration of dengue cases and their platelet counts thus proving platelet counts to be a predictive as well as a recovery parameter of DF/DHF/DSS. Other associated findings included hemoconcentration, leucopenia and presence of reactive lymphocytosis. Platelet parameters (MPV, PDW) showed no significant correlation with severity, serology and final outcome, thus excluding its role in dengue cases. We conclude that a correlation is found to be between dengue serological markers and platelet counts in dengue fever. Also serial platelet count monitoring can be used as a measure of severity and prognosis in a case of Dengue fever. However other platelet indices, like MPV and PDW were not found to have any significant correlation.

REFERENCES:

1. Guzman MG, Halstead SB, Artsob H, Buchy P, Farrar J, Gubler DJ, et al. Dengue: A continuing global threat. *Nat Rev Microbiol.* 2010
2. New ed. Geneva, Switzerland: World Health Organization; 2009. World Health Organization (WHO). Dengue- Guidelines for Diagnosis, Treatment, Prevention and Control
3. Chadwick D, Arch B, Wilder-Smith A, Paton N. Distinguishing dengue fever from other infections on the basis of simple clinical and laboratory features