Association of IgG, IgM Antibodies, NS1 Antigen and Platelet Count in the diagnosis of Dengue Virus Infection in Patients Attending Bharati Vidyapeeth Deemed University Medical College and Hospital, Sangli

Mohite Ravindra[1], Karanje C Nisha[2], Shubhangi A Gadgil[3], Inamdar Dhanashree[2], Jadhav Pradnya[4]

ABSTRACT

Introduction: In recent times, of all the viral diseases, dengue virus infection has become one of the most important mosquito borne viral disease. The new parameter NS1 protein, appears to be highly specific and reliable for diagnosis of dengue infection from first day of fever. Platelet count is the only parameter that supports the diagnosis of Dengue Shock Syndrome (DSS) and Dengue Hemorrhagic Fever (DHF). Therefore we tried to evaluate the association of platelet count against NS1 and lgG/lgM in dengue infections.

Material and Methods: Serum samples from clinical confirmed dengue cases were tested for NS1, lgG and lgM by rapid immunochromatographic test. Platelet count were obtained for all positive cases and 150 dengue seronegative cases of fever that served as control.

Results: Test results of dengue specific parameter were compared against platelet count. A total of 4416 samples were tested 686 were positive for one or more dengue parameter of 686232 were positive for NS1 only, 330 showed lgM only, while 62 showed lgG only. Thrombocytopenia was commonly associated with NS1 antigen as compared to antibody detection.

Conclusion: Association of thrombocytopenia in dengue parameter positive cases was highly significant when compared to thrombocytopenia in dengue parameter negative cases.

Keywords: Dengue, NS1, lgG, NS1, lgM, Thrombocytopenia

INTRODUCTION

Dengue is an acute febrile illness, which is endemic in India. Dengue virus infection is transmitted by Aedes aegypti mosquito and the virus belongs to the family *Flaviviridae*, Four serotypes (DENV-1, DENV-2, DENV-3 and DENV-4) can be identified on the basis of neutalisation tests. Dengue virus infection affects 100 million population annually. Out of the 5,00,000 cases are Dengue Haemorrahagic fever (DHF) and dengue shock syndrome (DSS), children seem to be maximum affected.[1,2]

In Majority of the Dengue virus infection cases are asymptomatic or presents as undifferentiated viral fever. The complications like Dengue Haemorrahagic fever and Dengue Shock syndrome develops due to intravascular fluid leakage and bleeding tendencies.[3,4]

At present scenario effective antiviral treatment and vaccine is not available in India. Rigorous intravenous fluid management and high index of suspicion of complications is only treatment modality. Diagnosis by RT-PCR is not available in most of the hospitals, as it is expensive.[5-7]

In most of the tertiary care laboratories and the periphery the "gold standard" for identification of Dengue Infection are not available. Thus, in the periphery, dengue diagnosis is mainly by detection of IgG/IgM antibodie and NS1 antigen sare known to give false positive and false negative results. NS1 detection is the recent, most sensitive and highly specific test for detection of Dengue infection. Therefore we tried to evaluate the association of platelet count against NS1 and lgG/lgM in dengue infections.

MATERIAL AND METHODS

Retrospective study was done on 4416 samples for the period of 24 months, June 2013 – June 2015, BVDU MC, Sangli, Dept of Microbiology, a Tertiary Care hospital. Study was done with the help of Test Kit, Dengue Day 1 test, Manfug. By J. Mitra and company pvt. Ltd. New Delhi, India. Samples were tested for NS1 Ag. IgG and IgM. Test was performed as per manufactures instructions. Platelet count was recorded in dengue + and –ve cases.

STATISTICAL ANALYSIS

Microsoft office 2007 was used to make tables. Results of the study are based on descriptive statistics using mean and percentages.

RESULTS

Results obtained were analyzed and evaluated.

Out of 4416 samples (serum) tested a total of 686 specimens were tested +ve for either one of the 3 markers (NS1, IgG, Ig M) tested of the 686 serum samples. 272 (39.65%) pts were positive for NS1 only 360 (52.47%) were positive for IgM only 22 (3.2%) were positive for IgG only (table-1).

More than one marker was detected in the remaining 32 (14.6%) samples. In 506 cases (73.76%) platelet count was less than 1,00,000/ml was observed. The rapid dengue test negative patients presenting with fever were 356, of these 142 (40%) cases showed thrombocytopenia (table-2).

DISCUSSION

Dengue infection has symptoms similar to other viral infection

[1]Associate Professor, [2]Assisstant Professor, [3]Professor, [4]Tutor, Bharati Vidyapeeth Deemed University Medical College and Hospital, Sangli, India

Corresponding author: Dr. Nisha C Karanje, Department of Microbiology, BVDUMC and H, Miraj-Sangli Road, Sangli, India

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Parameter	Total	%
NS1 only	232	33.81%
IgM only	330	48.1%
IgG only	62	9.03%
NS1 and IgM	32	4.66%
NS1 and IgG	18	2.62%
IgM and IgG	12	1.74%
Total	686	
Table-1: Distribution of Samples		

Parameter	Total	Platelet Count < 1lakh	%
NS1	232	182	78.44%
IgM only	330	152	46.06%
IgG only	62	45	72.58%
NS1 and IgM	32	30	93.75%
NS1 and KIgG	18	18	100%
IgM and IgG	12	9	75%
Total	686		
Table-2: Samples and platelet count			

like fever, URTI, malaise, anorexia, bodyache etc. The assessment of NS1 antigen detection is an important diagnostic tool. For proper management of patients and to prevent dengue outbreaks, it is important to diagnose acute dengue virus infection at the earliest. Isolation of virus, detection of viral genomic sequence by nucleic acid amplification and detection of dengue virus specific IgM antibodies by the IgM capture enzyme-ELISA and /rapid dengue ICT are the basic methods used by most of the laboratories to establish the diagnosis of dengue virus infection.[6]

Detection of the viral genomic sequence by RT-PCR is an expensive method and is not available in most hospital.[7] NS1 antigen detectable from day1 of fever in both primary and secondary infections and is highly specific viral marker which makes it extremely reliable parameter for the diagnosis of dengue infection from day 1 of fever,both in primary and secondary infections.

Thus, the highly specific marker for dengue infection is NS1 antigen. It has no cross reaction with those of the other related Flaviviruses It is considered to be highly specific marker. It has a long half life in blood, therefore detection of NS1ag in early febrile stage very important step in the diagnosis.[8,9]

NS1 Ag positivity was 33.81% in acute phase sera in study group I.

With symptoms of viral infection,NS1 assay helps in the early diagnosis of dengue infection. Thus early detection helps in early management and prevention of DHF.[10,11]

Platelet count are decreased in other viral conditions other than Dengue-Idiopathic thrombocytopenia. We therefore, tried to correlate platelet counts in cases of fever that tested negative for any of the dengue parameters.[3] In 356 cases of fever, in which none of the dengue parameters was positive, thrombocytopenia was noted in 40% cases (142 of 356).

CONCLUSION

Association of thrombocytopenia in dengue parameter positive cases was highly significant when compared to thrombocytopenia in dengue parameter negative cases. In India, the state of art, highly sensitive techniques like ELISA, Viral culture and PCR are not easily available for the diagnosis of DI. Thus we rely on ICT for early diagnosis. Thus ICT is the only excellent tool as it is easy, rapid and easily available in areas with poor resources.

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