Original Research

Correlation of NS1 antigen with Platelet counts in early diagnosis of dengue infection

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Abstract
Introduction: Dengue is a mosquito-borne viral disease (aedes aegypti mosquito) caused by dengue virus belonging to the family flaviviridae and genus flavivirus.It is one of the most serious, rapidly spreading tropical diseases in the last five decades.This study was undertaken to evaluate the efficacy of NS1 antigen and platelet count.
Material and method: The present study was a retrospective study, conducted in the Pathology department of National Institute of Medical Sciences, Jaipur from January 2024 to November 2024. Total 366 serum samples were collected from clinically suspected cases of dengue
Result: Out of 366 samples screened in our study, 13 (3.55%) were positive for dengue parameters, 353 (96.44%) were negative. Out of 366 samples, 196 (53.56%) were males and 170 (46.44%) were females. Male : Female ration is 1.15:1. Thrombocytopenia was observed in all 13 (100%) samples. 9 samples (69.23%) out of 13 had platelet count $<50 \times 10^9$/L, while 4 had $>50 \times 10^9$/L .
Conclusion: Our study shows strong association between decreased thrombocyte count and NS-1 positive patients.
Keywords: Dengue, thrombocytopenia, NS1 antigen

INTRODUCTION

Dengue is a mosquito-borne viral disease (aedes aegypti mosquito) caused by dengue virus belonging to the family flaviviridae and genus flavivirus.It is one of the most serious, rapidly spreading tropical diseases in the last five decades. Dengue is an acute viral infection with fatal complications. To reduce the disease burden, early and specific diagnosis of dengue hemorrhagic fever or dengue shock syndrome with supportive therapy reduces morbidity and mortality. [1]
Diagnosis and confirmation of dengue viral infection can be done by viral culture, viral RNA detection by reverse transcriptase Polymerase Chain Reaction (RTPCR) and serological tests such as an immunoglobulin M (IgM) capture enzyme-linked immunosorbent assay (MAC-ELISA).[2]In many dengue endemic remote areas with limited laboratory diagnostic services there rapid diagnostic tests are simple method which provides the immediate diagnosis and early management. The confirmation of these results can be done later as there is no antiviral treatment or vaccine available to prevent infection.
This study was undertaken to evaluate the efficacy of NS1 antigen and platelet count.

MATERIAL AND METHOD

The present study was a retrospective study, conducted in the Pathology department of National Institute of Medical Sciences, Jaipur from January 2024 to November 2024. Total 366 serum samples were collected from clinically suspected cases of dengue out of which 13 samples were positive for either one or more of the dengue parameters. The samples were tested in central laboratory for NS1 antigen, IgM and IgG antibodies by using the immunochromatography test kit- Dengue NS1 antigen and antibody using Combi Card supplied by manufacturer. Haematological parameters of all the dengue positive cases were recorded using haematology analyser. Statistical analysis was done by using Chi-square and Z-test wherever applicable.

RESULT

Out of 366 samples screened in our study, 13 (3.55%) were positive for dengue parameters, 353 (96.44%) were negative.
Out of 366 samples, 196 (53.56%) were males and 170 (46.44%) were females (Figure 1). Male : Female ration is 1.15:1. Thrombocytopenia was observed in

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all 13 (100%) samples. 9 samples (69.23%) out of 13 had platelet count $<50X10^9$/L, while 4 had $>50X10^9$/L (Table 1).
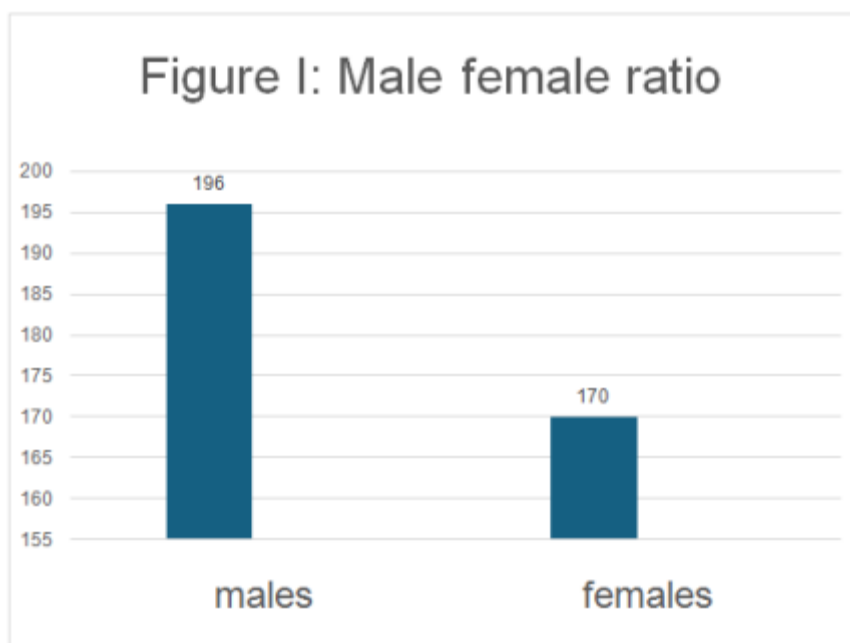

Figure I: Male female ratio

Table 1-Comparison of platelet count with various dengue parameters (n=366)

Total positive serum sample	Platelet count	
	$<50X10^9$/L	$>50X10^9$/L
13	9	4

Table 2- Association of platelet counts with NS1 positivity in dengue infection (n=366)

	Platelet count			
	<50000/ml	<1 lakh/ml	>1lakh/ml	Total
NS1Positive	9	4	0	13
NS1 antigen negative	0	106	247	353
Total	9	110	247	366

The P value is less than 0.0001. The association is considered to be statistically significant.
Out of 366 cases, 13 were NS1 antigen positive and 353 were negative. 0ut of 353 seronegative cases 106 (30%) cases had thrombocytopenia and 247 (70%) cases had normal platelet count.

DISCUSSION
In our study 13/366 (3.55%) cases are positive for NS1 antigen which are comparable to the study of Tathe S et al[1] in which 56/93 (60%) were positive , Badave et al[2] have shown 54//126 (42.9%) cases to be positive for NS1. Other studies by Kulkarni et al[3] have shown NS1 positivity in 95/320 (30%) cases. Datta and Shrivastava have shown that NS1 was positive in 140/600 (23.3%) and 15/91 (16%) cases respectively.[4,5]
In Dengue fever the virus may interact and activate platelets leading to thrombocytopenia or may affect growth and differentiation of thrombopoiet in induced megakaryopoiesis inducing apoptotic cell changes in a subpopulation of early megakaryocytic progenitors.

These events might contribute towards the origin of thrombocytopenia in dengue disease. In our study among 13 seropositive cases thrombocytopenia was seen in all cases. This is comparable to 68.8% in the study of Kulkarni et al[3] and 81.1% in the study of Tathe et al[1] .
Out of 353 seronegative cases thrombocytopenia was seen in 106 cases (30%) and this association is considered to be statistically significant [Table no. 2]. This Reduction in platelet count observed in dengue negative cases may be due to other causes like viral infections other than dengue, vitamin deficiency, collagen vascular disorders, drug induced thrombocytopenia etc .[6,7] Out of 13 NS1 positive cases, thrombocytopenia was evident in all cases (100.0%) . This association is considered to be statistically significant which is comparable to the study of Kulkarni et al, Sindhanai et al[8] and Tathe et al Study. The cases with rapid decrease in platelet and white blood cell count with rising haematocrit levels are most likely to be due to dengue infection.[9]

CONCLUSION

Our study shows strong association between decreased thrombocyte count and NS-1 positive patients.Dengue is endemic to Indian subcontinent. Measuring platelet count and detecting the NS1 antigen plays a vital role in early diagnosis, management and implementing the control measures in community to avoid spread of dengue.

CONFLICT OF INTEREST

None as stated by authors

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