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Original Research Paper

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# SIGNIFICANCE OF SEROLOGICAL MARKERS AND PLATELET COUNT IN DIAGNOSING DENGUE INFECTION WITH SPECIAL REFERENCE TO NS1 ANTIGEN

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## ABSTRACT

**INTRODUCTION:** Dengue , a viral infection with a potentially fatal outcome ,it has become an endemic in India and its outbreak occurs every year. since the mainstay of diagnosis is antibody detection which has high false positive and false negative values, newer parameters are upcoming for diagnosis.
**AIM:** To study the importance of newer accessory parameter platelet count in diagnosing dengue infections
**MATERIALS AND METHODS:** This is a retrospective study conducted in general medicine department of S Nijalingappa medical college and HSK hospital, Bagalkot. 4ml blood sample collected from admitted patients suspected with dengue fever and the samples screened for NS1 antigen by immunochromatography method and was compared to the platelet count.
**STATISTICAL ANALYSIS :** Appropriate statistical tests and software were used and calculated accordingly
**RESULTS :** Out of 152 samples tested , 36 were positive for NS1 antigen and 25 were positive for IgM and these were compared to platelet counts of the respective patient
**CONCLUSION:** Inclusion of NS1 antigen in the diagnosis algorithm increases the chances of early diagnosis and helps in anticipating fatal complications associated with dengue. Thrombocytopenia was found more consistently in patients with dengue positive than with dengue negative.

**KEYWORDS :** dengue ; IgM ; NS1 ; thrombocytopenia

## INTRODUCTION :

dengue has been identified as one of the 17 neglected tropical diseases by WHO (who guidliness as reference ) approximately 1.8 billion population is at risk worldwide and in India various cases are reported from Andhra Pradesh, Gujarat, Karnataka, Haryana, kerala, Rajasthan , Maharasthra. Every year in the period of JULY 19–NOVEMBER 2019 an upsurge is seen. The agent of dengue infection, that is dengue virus, is categorized under the genus Flavivirus. It contain single stranded RNA and has a size of 50nm. There are four dengue virus serotypes which are designated as DENV-1, DENV-2, DENV-3 and DENV-4. These serotypes may be in circulation either singly, or more than one can be in circulation in any area at the same time. Although all four serotypes are antigenically similar, they are different enough to elicit cross-protection only for a few months after infection by anyone of them. Infection with any one serotype confers lifelong immunity to the virus serotype. Dengue NS1 antigen, a highly conserved glycoprotein which is produced in both membrane-associated and secretion forms, is abundant in the serum of patients during the early stages of DENV infection. It has been found to be useful as a tool for the diagnosis of acute dengue infections. It is a simple test that is more specific and shows high sensitivity.NS1 enables detection of the cases early, i.e. in the viremic stage, which has epidemiological significance for containing the transmission. The NS1 antigen assay is commercially available for DENV and many investigators have evaluated this assay for sensitivity and specificity. The NS1 assay may also be useful for differential diagnostics between flaviviruses because of the specificity of the assay.[1]

## MATERIALS AND METHODS :

The study was conducted in S Nijalingappa medical college and HSK hospital , the clinically suspected patients were admitted in wards and were included in the study during the period July-2019 to December 2019 since our laboratory works round the clock and hence the samples were tested immediately for NS1 , IgG, IgM.These tests were performed strictly as per manufacture instructions. Sample for platelet count of all these study patients were collected and calculated using manual method.

## RESULTS:

out of 152 samples tested , 68 samples tested positive for one or more serological markers of dengue. 28 of 68 (41%) were only NS1 positive , whereas 17 of 68 ( 25%) were only IgM positive.

Platelet count of less than 1,00,000/cumm was seen in 64 of 68 dengue positive cases, However, of 84 dengue negative patients only 5 had platelet count less than 1,00,000/cumm. After subjecting these values for statistical analysis, P value was found to be <0.001 suggestive of highly significant result.

| PARAMETER | TOTAL POSITIVE | PERCENTAGE |
|---|---|---|
| NS1 ONLY | 28 | 41% |
| IGM ONLY | 17 | 25% |

| AGE GROUPS | PLATELET COUNT <1 LAKH | PLATELET COUNT >1 LAKH | TOTAL |
|---|---|---|---|
| DENGUE POSITIVE | 64 | 4 | 68 |
| DENGUE NEGATIVE | 5 | 79 | 84 |
| TOTAL | 69 | 83 | 152 |

P value <0.001 (highly significant), chi square $x^2$-117.8

## DISCUSSION :

- In a study conducted by Kulkarni RD, Patil SS, Ajantha GS, Upadhya AK, Kalabhavi AS, Shubhada RM, Shetty PC, Jain PA , Of the 2104 serum samples tested, a total of 320 specimens were tested positive for either one or more of the three markers (NS1, IgM and IgG) tested. Of the 320 serum samples, 95 (29.68%) patients were positive for NS1 only, 161 (50.3%) positive for IgM only, while 9 patients had only IgG. More than one marker was detected in the remaining 55 (17.18%) samples [Table 1]. Platelet count less than 1, 00,000/ml was noticed in 220 cases (68.75%). Of the 150 cases presenting with fever that were negative for any of the dengue-specific parameters by ICT, 45 showed thrombocytopenia (30%)[2].
- In a study conducted by Datta S, Wattal C. Dengue NS1 antigen detection , In Group I, 140 (23.3%) and 235 (39.1%) samples were positive by NS1 assay and MAC-ELISA respectively. The detection rate increased to 320 (53.3%) when both the assays were used together on a single sample. NS1 Ag positivity varied from 28.4% to 71.42% in acute and early convalescent sera, conversely IgM detection rate was 93.61% and 6.38% in early convalescent and acute phase sera respectively (*P* <

0.0001). In Group II, 66.66% (20) samples were positive by NS1 assay. All the samples in Group III were negative showing 100% specificity of both the assays[3].

- In a study conducted by Jyothi P, Metri BC. Correlation of serological markers and platelet count in the diagnosis of Dengue virus infection, A total of 520 serum samples were collected from the suspected dengue fever patients. Sixty-two samples tested positive for one or more dengue-specific parameters. Out of the 62 samples, 39 (62.9%) were positive for the NS1 antigen, only seven (11.3%) were positive for IgM, and only three (4.9%) were positive for IgG. A platelet count < 1,00,000/ml was observed in 32 cases (51.6%). When the platelet count was done in 100 dengue parameter-negative fever patients (controls), thrombocytopenia was observed in 30% of the cases[4].
- In a study conducted by Badave GK, Swaroop PS, Rao PN. Importance of NS1 antigen detection and its association with platelet count for early diagnosis of dengue virus infection , out Of the 327 serum samples tested, a total of 126 (38.5%) specimens were positive for either one or more of the three serological markers (NS1, IgM and IgG) tested. Of the 126 positive serum samples, 54 (42.9%) specimens were positive for NS1 only, 6 (4.7%) positive for IgM only, while 30(23.9%) patients had only IgG positive. Platelet count less than 1,00,000/ml was noticed in 76 (60.31%) out of 126 cases. Statistical analysis revealed a significant association of NS1 antigen positivity and thrombocytopenia[5].

## CONCLUSION :

NS1 is an excellent tool for evaluating febrile patients. Use of immunochromatographic technique helps in easy, quick and dependable diagnosis of potentially fatal disease which has become an important public health issue. Outbreak of dengue often occurs in resource poor areas where platelet count and immunochromatographic technique based tests might be the only support .

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