



TO DETERMINE THE CORRELATION OF PLATELET COUNT AMONG DENGUE NS1 POSITIVE CASES IN A TERTIARY CARE CENTRE

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ABSTRACT

Background : Dengue, an acute febrile illness caused by the dengue virus (DENV) and transmitted by Aedes aegypti mosquitoes, affects over 2.5 billion people worldwide, with more than 50 million new infections annually. It can range from mild flu-like symptoms to severe forms like dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). The NS1 protein, detectable early in the illness, serves as a sensitive diagnostic marker, while platelet count helps diagnose DSS and DHF. This study aims to correlate platelet count with NS1 antigen as a diagnostic tool. **Aim and Objective of the Study:** To determine the presence of NS1Ag among clinically suspected dengue cases. To analyse the correlation between NS1 Ag positive cases and their platelet count. **Materials and Methods:** A cross-sectional study was conducted for a time period of 5 months, between 1 January 2024 and 31 May 2024. 1296 Serum samples of acute febrile illness suspected dengue cases were collected and subjected to NS1 Ag antigen detection by ELISA. Platelet counts were estimated from all NS1 Ag seropositive cases by Ebru Automated Hb analyser. All procedures were performed as per manufacturer's instructions. **Results:** Among 1296 dengue suspected patients Dengue NS1Ag was positive in 15.1% (196/1296). Among the cases, the majority were paediatric comprising 56.6%, followed by males at 26.2% (51 out of 196) and females at 23.9% (47 out of 196), indicating a slight difference between the sexes. All NS1 antigen-positive cases had platelet counts within normal limits. **Conclusions:** The present study revealed that the platelet count among the NS1 Ag positive cases was within the normal limits. To anticipate haemorrhagic manifestation, it is difficult to rely solely on the detection of dengue antigen, so there is a need of additional diagnostic test which can help clinically for the effective management of dengue cases.

KEYWORDS : Dengue, Ns -1 Antigen, Platelet counts**INTRODUCTION**

Dengue is an acute febrile illness endemic to the Indian subcontinent, caused by the Dengue virus (DENV), and is one of the most significant mosquito-borne viral diseases. It affects over 2.5 billion people globally, with the number of cases sharply increasing in recent decades. Over 50 million new infections are expected annually. The DENV virus, belonging to the Flaviviridae family, is transmitted to humans primarily by Aedes aegypti mosquitoes. Infection with any of the four DENV serotypes can result in symptoms ranging from mild dengue fever (DF) to severe forms, including dengue hemorrhagic fever (DHF), which is marked by coagulopathy, increased vascular fragility, and permeability. In severe cases, DHF can progress to dengue shock syndrome (DSS), potentially leading to hypovolemic shock.

The NS1 protein, conserved across all dengue serotypes, is present at high levels during the early stages of infection. Detection of NS1 has become a promising diagnostic method due to its long half-life in the blood, offering high sensitivity and specificity. Platelet count is another important parameter, as it supports the diagnosis of DSS and DHF. This study aims to correlate platelet count with the NS1 antigen, a specific serological marker for dengue infection.

MATERIALS AND METHODS**Study Type -** A cross-sectional study**Study Setting -** Patient attending a tertiary care center in Kadapa**Study Duration -** 5 months [1 January 2024 and 31 May 2024]**Study Population -** Inclusion criteria

Dengue NS1 positive cases

Serum samples from all age group

Exclusion Criteria: Non -NS1 positive dengue cases**Study Sample -** A total of 1296 serum samples were included in the study.

Serum samples from the suspected dengue fever patients were collected and subjected to NS1 Ag antigen detection by ELISA. Platelet counts were estimated from all NS1 Ag seropositive cases by Ebru Automated Hb analyser. All procedures were performed as per manufacturer's instructions.

RESULTS

Among 1296 dengue suspected patients Dengue NS1Ag was positive in 15.1% (196/1296). In the present study, most cases were among children, with the highest positivity rate found in those under 10 years old (56.6%), followed by 11-20 years (23.4%), 21-30 years (20.0%), 31-40 years (11.42%), 41-50 years (9%), 51-60 years (8.33%), 61-70 years (4.7%), and those over 71 years (3.7%). [Table - 1]. In this present study Dengue positivity rates are similar for adult males and females indicating only a slight difference [Table - 2]. In the present study the platelet count in all the NS1 Ag positive cases were within normal limits [Table - 3]

Table 1-Age Wise Distribution Of NS1 Positive Cases

Age Group	No Of Positive Cases	No Of Negative Cases	Percentage Of Positive Cases	Total No Of Cases
< 10	68	52	56.6 %	120
11-20	34	111	23.4 %	145
21-30	30	120	20 %	150
31-40	20	155	11.42 %	175
41-50	18	182	9 %	200
51-60	10	110	8.33 %	120
61-70	08	162	4.7 %	170
>71	08	208	3.7 %	216
TOTAL	196	1100	15.1 %	1296

The age-wise distribution of NS1 positive cases shows varying positivity rates across different age groups. In those under 10 years old, 68 out of 120 cases were positive, accounting for 56.6%. The 11-20 age group had 34 positive cases out of 145 (23.4%), while 30 out of 150 cases in the 21-30 range were positive (20%). The 31-40 group had 20 positive cases from 175 (11.42%). Among those aged 41-50, 18 out of 200 were positive (9%). The 51-60 group had 10 out of 120 (8.33%), and older age groups showed lower positivity rates. Overall, the positivity rate was 15.1%.

Table 2-Gender Wise Comparison Of NS1 Positive Cases

CATEGORY	NUMBER OF POSITIVE CASES
CHILDREN [< 10 YEARS]	68
ADULT MALES	51
ADULT FEMALES	47
TOTAL	196

The gender-wise comparison of NS1 positive cases shows that among children under 10 years, there were 68 positive cases. In the adult category, males accounted for 51 positive cases, while females had 47 positive cases. Overall, the total number of NS1 positive cases was 196.

Table 3 - Association Of Platelet Counts With Seropositivity In Dengue Infection

PLATELETS RANGE	NS 1 POSITIVE CASES
PLATELETS < 100,000	0
PLATELETS >100,000	196

The no of NS1 positive cases were found in individuals with platelet counts below 100,000. However, 196 NS1 positive cases were observed in those with platelet counts exceeding 100,000.

DISCUSSION

In the present study children [56.6 %] are mostly affected. As the children play in the open fields more active in outdoor games, which makes them prone to an attack from Aedes mosquitoes.

In this present study Dengue positivity rates are similar for adult males (26.2%) and females (23.9%), indicating only a slight difference.

In the present study the platelet count in all the NS1 Ag positive cases were within normal limits. In dengue, low platelet counts (thrombocytopenia) can happen because the bone marrow doesn't make enough platelets or because the platelets are being destroyed or removed from the blood more quickly than usual.

In the present study, there is no correlation between Dengue NS1 Ag seropositive cases and thrombocytopenia. The present study is conducted on the 3rd day of illness, during the acute febrile phase of dengue fever, thrombocytopenia (low platelet count) might not be very pronounced. Platelet counts are within the normal limits or only slightly decreased.

The NS1 Ag test, which detects the dengue virus protein, is most effective in identifying the virus during the early part of the illness, typically from day 1 to day 9. As the illness progresses, the NS1 antigen level initially reflects the viral load but decreases over time because the body produces antibodies that capture the NS1 antigen in immune complexes, making it less detectable.

In a study conducted by Parameswarappa Jyothi et al. out of 39 cases that were positive for NS1 alone, thrombocytopenia was observed in 20 cases (51.2%), whereas, when NS1 plus IgM antibodies were considered, thrombocytopenia was observed in five out of six cases (83.3 %). In a study conducted by Rd Kulkarni et al. NS1 alone only from total 95 cases, thrombocytopenia was observed in 70 cases [73.7%]. NS1 and IgM from total 34 cases, thrombocytopenia was observed in 32 cases [94.01%]. NS1 and IgG from total 01 case, thrombocytopenia was observed in 01 case [100 %]. Dengue IgM ELISA typically becomes detectable around 4 to 7 days after the onset of symptoms. This timing corresponds with the later phase of the acute illness, when the body starts producing IgM antibodies in response to the dengue virus. To accurately rule out dengue complications and assess thrombocytopenia, it is crucial to use both the NS1 antigen test, which detects the virus early, and the IgM ELISA, which confirms a recent infection.

Limitations

The present study limitations was the platelet counts in NS1 antigen-positive cases were mostly normal, which may affect the correlation with thrombocytopenia. Conducting the investigation on the third day of illness, when thrombocytopenia might not be evident, could lead to an underestimation of the relationship between NS1 positivity and platelet levels.

Additionally, while previous studies Parameswarappa Jyothi et al., Rd Kulkarni et al. showed different levels of thrombocytopenia associated with NS1 and IgM positivity, this study did not find similar results, suggesting that sample size or demographic differences may play a role.

The study also did not track NS1 antigen levels over time, which could offer insights into thrombocytopenia timing. Lastly, relying solely on the NS1 test, without monitoring platelet counts over time or including IgM and IgG tests, may limit the assessment of dengue severity and complications.

CONCLUSION

The present study revealed that the platelet count in all the NS1 Ag positive cases was within the normal limits.

To anticipate haemorrhagic manifestation, it is difficult to rely solely on the detection of dengue antigen, so there is a need of additional diagnostic test which can help clinically for the effective management of dengue cases.

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