



A PROSPECTIVE STUDY ON VARIOUS SEROLOGICAL MARKERS AND PLATELET COUNT IN DENGUE INFECTION IN AND AROUND KANCHEEPURAM.

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ABSTRACT **INTRODUCTION:** Dengue is an acute viral infection with potential fatal complications, presenting with non-specific fever that mimics other febrile illness. Specific antibody detection has been the mainstay of diagnosis which is prone for false positive and negative reactions. The newer parameter NS1 appears to be highly specific and reliable for diagnosis. Therefore, we tried to evaluate the association of platelet counts against NS1 and IgM / IgG in dengue infections.

OBJECTIVE: To study the association of thrombocytopenia with NS1 antigen and specific antibodies in dengue infection in kancheepuram population.

MATERIALS AND METHODS: Serum samples from clinically suspected dengue cases were tested for NS1, IgM, IgG by immunochromatography – based test. Platelet counts were obtained from all positive cases. Test results of dengue-specific parameters and platelet counts were compared.

RESULTS: Of the 612 samples tested, 150 were positive for one or more dengue serological markers. Of the 150, 27(18%) were positive for NS1 only, 45(30%) were positive for IgM, 54(36%) were positive for IgG only. Of the 150, 39(26%) showed platelet count less than 1 lakh.

CONCLUSION: Inclusion of NS1 in the diagnosis of dengue increases the detection and specificity rate. Thus correlation of platelet count, NS1, IgM and ,IgG gives detailed picture of the stage and prognosis of the disease.

KEYWORDS : Dengue, NS1, IgM, IgG, Thrombocytopenia.

INTRODUCTION:

Dengue is an acute viral infection transmitted to humans by Aedes mosquito species. It is a major cause mortality in tropical and sub tropical regions (1). Majority of the infections are asymptomatic and the clinical manifestations occur in two forms- classical dengue fever and dengue haemorrhagic fever/dengue shock syndrome (DHF/DSS) (2). DHF/DSS are uncommon in individuals above 15 years and are more common in secondary infections (3,4). Dengue virus infection in humans causes a spectrum of illness ranging from inapparent or mild fever to severe and fatal haemorrhagic disease [5,6]. Classic dengue fever is marked by a rapid onset of high grade fever, headache, retro-orbital pain, diffuse myalgia, weakness, vomiting, sore throat, an altered taste sensation, and a centrifugal maculopapular rash [7]. DHF and DHS are potentially fatal complications which are often associated with an infection by a second serotype [8]. Dengue is one of the neglected tropical diseases in India with a global incidence of 53% (9).

Four antigenically related serotypes of Dengue are found by neutralisation assay. Infection with one serotype confers an individual life-long immunity to that serotype and cross-reactivity to other serotypes (10).

The disease has high mortality and morbidity rate, a rapid and accurate diagnosis is required for early and appropriate management and for the prevention of haemorrhagic complication. Early diagnosis has been a problem as all these assays have their own pitfalls (11). Though detection of dengue specific IgM/IgG antibody aids in the diagnosis it is prone for false positive and negative reactions. NS1 antigen is a highly conserved glycoprotein and its detection is both sensitive and specific (12,13).

AIM AND OBJECTIVES:

1. To detect the various serological markers associated with Dengue infection.
2. To find the association of thrombocytopenia with serological markers in Dengue infection.

MATERIALS & METHODS:

Study design : Prospective study

Study period: June 2019- July 2020

Study population:

All patients outpatient and inpatients with history of fever, headache, arthralgia, myalgia, headache or bleeding history was included in the study.

Sample collection & Processing : Under sterile precautions 7 ml of venous blood sample was collected in plain and EDTA tubes. The platelet count was checked using EDTA samples with Beckman

coulter 5 part analyser. The serum samples separated by centrifuging the plain tubes. The serum samples were assessed for the presence of NS1 Antigen, IgM and IgG Antibody using Pan bio Dengue ELISA kit..

RESULTS:

The Total Number Of Dengue Cases Among The Study Population Is Shown In Figure 1.

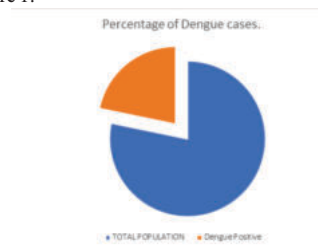


Fig 1: total Number Of Dengue Cases

Age and sex wise distribution of the Dengue cases is shown in Table 1
Table 1: Distribution Of Dengue Positive Cases

STUDY GROUP	ADULT	PAEDIATRIC	TOTAL
MALE	274	62	336
FEMALE	56	20	76
TOTAL	330	82	412

The presence of various serological markers in Dengue cases is shown in Table 2

Table 2: Positivity of serological markers in Dengue cases

IgM	412	207 (50%)
IgG	412	197 (48%)
NS1	412	316 (77%)
IgG & IgM	412	97 (23.5%)
IgM & NS1	412	106 (26%)
IgG & NS1	412	67 (16%)
NS1, IgM & IgG	412	64 (15.5%)

The correlation of Thrombocytopenia with the presence of the serological marker is shown in Table 3

Table 3: Correlation Of Thrombocytopenia with serological markers

Serological marker	TOTAL POSITIVE	THROMBOCYTOPENIA
IgM	182	111 (61%)
IgG	197	71 (36%)
NS1 Only	316	197 (62%)

IgG & IgM	97	41 (42%)
IgM & NS1	106	80 (75%)
IgG & NS1	67	23 (34%)
NS1, IgM & IgG	64	26 (41%)

DISCUSSION:

For a long time detection of Dengue-specific IgG/IgM has been the mainstay in the diagnosis of Dengue. Even in most secondary infections, both the IgM and IgG type antibodies cannot be recorded before third day. The NS1 antigen, is detectable from day 1 of fever both in primary and secondary infections. NS1 is a more specific and reliable in the diagnosis of Dengue. Stage of the disease can be obtained by correlating the various blood parameters.

Data from our study showed a prevalence rate of 24.5% which is almost similar to the studies conducted in and around Chennai. Analysing the data it reveals inspite of the various efforts taken in controlling Dengue infection it still remains and contributes to an accountable number of Fever cases.

Author	Year of study	Prevalence rate	District
Shahnaz begum et al (14)	2018	30%	Kancheepuram
Gunasekaram et al (15)	2006-2008	43%	Chennai
Priyadarshini et al (16)	2014-2015	38.5%	Kelambakkam

Also in our study we found the major number of Dengue cases were in Adult Male population. The possible explanation could be due to increased outdoor contact than the paediatric or the female population in our setting.

In our study we found the presence of IgM & IgG was 50% and 48% respectively. The combined presence of IgM & IgG was 23.5%. Isolated presence of NS1 was seen in 77% cases indicating the presence of Primary dengue infection in a majority of Dengue cases.

On exploring the correlation of Thrombocytopenia with the presence of serological marker it was found in NS1 positive cases 62% had thrombocytopenia followed by IgM in which 61%. This is similar to the results obtained in other studies done by Asim kumar singh et al and shivraj nagnath et al showing 65% and 67% respectively (17,18). Primary Dengue cases with NS1 & IgM positivity had a strong association with thrombocytopenia of 75%. Shivraj nagnath et al (18) also obtained 79%. In our study Secondary Dengue cases with NS1 & IgG had a least association with thrombocytopenia of 34%.

CONCLUSION:

This study highlights the importance of NS1 antigen testing as an important tool in the early diagnosis of Dengue infection. NS1 Antigen testing not only aids in early diagnosis but also has a strong association with thrombocytopenia.

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