

ORIGINAL RESEARCH

A study on Seroprevalence of dengue IgM and IgG antibodies in children suffering from febrile illness in correlation with platelet count.

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ABSTRACT:

Background: Dengue is the commonest arboviral infection affecting large group of population every year. Secondary dengue infection is associated with various complications like hypovolumic shock, DIC and DSS. Early detection and prediction of complications will help in appropriate management of the disease. Determination of Dengue IgM and IgG will help in identifying the primary and secondary infections. Current study is aimed to detect dengue IgM and IgG antibodies in febrile illness children.

Methodology: A total number of 96 clinically suspected pediatric cases of dengue were included in the study. Serum samples were collected and stored as per protocol. Dengue IgM and IgG antibodies were detected in the serum samples by ELISA using pan bio dengue capture elisa kits. Platelet count of the patients were recorded.

Results: Out of 96 samples 62 were positive either for dengue IgM or IgG. In the present study male preponderance of disease is noted, maximum age group affected is 6-10yrs, common complaint is fever and myalgia. Out of 62 seropositive cases 35 (56.45%) were primary infections positive only for dengue IgM, 15 (24.19%) were secondary infections positive for both IgM & IgG and 12(19.35%) were past infections only positive for IgG. Among the 15 secondary dengue infections low platelet count was found in 93% cases, with a significant p-value 0.00467(p<0.05).

Conclusion: Detection of Dengue IgM and IgG is very important to know the type of infection and helps in prevention of complications.

Keywords: Dengue IgM, IgG, ELISA, platelet count

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INTRODUCTION

Dengue fever is an arboviral disease transmitted by *Aedes aegypti* mosquitoes affecting millions of people every year.⁽¹⁾ The causative agent Dengue virus belongs to family flaviviridae genus flavivirus.⁽²⁾ Dengue accounts for number of deaths every year. The spectrum of disease varies from a self limiting flu like illness known as Dengue fever to dengue hemorrhagic fever. It may present as fulminant disease in the form of Dengue Shock Syndrome (DSS) which is manifested by hypovolumic shock, Disseminated intravascular coagulation

and Multi organ dysfunction syndrome.^(3,4) Dengue infection can affect any age group of individual, but the disease prevalence is high in young age group mainly affecting the children.⁽⁵⁾ Severity related to dengue infection is high in children and associated with high mortality rate. This can be attributed to the four Dengue serotypes (1,2,3 and 4). Primary infection with one serotype produces lifelong immunity, but secondary infection with other serotype is linked with increased risk of DHF and DSS due to antibody enhancement phenomenon.^(4,6) Detection of dengue specific IgM and

IgG antibodies is useful in differentiating the primary and secondary infection. Primary infection is characterized by presence of significant or raising level of IgM antibodies. Along with Dengue IgM antibodies, dengue IgG levels are high in secondary infection; IgG levels raise quickly and peak about 2 weeks after the onset of symptoms and then declining slowly over 3 to 6 months. Dengue IgM antibodies are low during secondary infection. Present study was aimed to detect dengue IgM and IgG antibodies in clinically suspected cases of dengue, to categorize the type of infection and correlating with platelet count.

MATERIALS AND METHOD

A prospective observational study was conducted at Niloufer hospital, Hyderabad between August to October 2019, when the maximum numbers of cases were reported. Clinically suspected cases of dengue with history of fever more than 5 days of duration, myalgia, retro-orbital pain, rash, muscle pains, loose stools, abdominal pain and arthralgia were included in the study. Children below 14 years of both sex were included in the study. Children with congenital deformities and suffering from afebrile illness were excluded from the study. Informed consent from the parent or guardian was taken. The blood samples were collected under aseptic precautions according to the standard protocol and allowed to coagulate. Serum was separated and aliquated in the leak proof tubes and stored at -20°C. All serum samples were tested by two different ELISAs to detect dengue IgM and IgG by using panbio dengue IgM capture elisa kit (ref 01pe20, lot: 01p20e004), panbio dengue igg capture elisa kit respectively. The test was performed according to the standard operating procedure and manufacturers guidelines. Positive and negative results were recorded. Platelet count of all the cases were collected and recorded. The data was entered and stored in Microsoft excel data sheet for statistical analysis.

RESULTS

A total number of 96 cases were included in the study. Among them 34 (35.41%) were females and 62 (64.58%) were male children. Maximum number of

cases belong to 6-10yrs group comprising up to 41.66% followed by 1-5yrs comprising up to 38.54% (refer to table number 1). Among 96 children 92 cases were presented with fever, 36 cases with fever and rash, 68 cases presented with myalgia and 34 cases presented with retro orbital pain. Among the 96 samples 62 samples were positive for either IgM or IgG positive comprising up to 64%. A total number of 50 cases were positive for Dengue IgM showing a Prevalence of 52% during the study period. Among 62 cases 12 were positive only for IgG showing the past infection. Out of 96 cases 34 patients were negative for both comprising up to 36%. Out of 62 positive cases 22 were girls and 40 were boys. Out of 62 dengue positive cases, 15 (24.19%) were positive for both Dengue IgM and IgG antibodies, 35 (56.45%) cases were positive for Dengue IgM and negative for Dengue IgG, 12 (19.35%) cases were positive for Dengue IgG and negative for Dengue IgM. (Refer to table No 2) Out of 62 dengue positive cases, 35 (56.45%) cases were positive for Dengue IgM and negative for Dengue IgG thus presented with primary infection, 15 (24.19%) were positive for both Dengue IgM and IgG antibodies thus presented with past infection, 12 (19.35%) cases were positive only for Dengue IgG presented with secondary infection. Out of over all 62 dengue sero-positive cases, normal platelet count is observed in 32 cases and low platelet count is seen in 30 cases. Among the primary dengue cases platelet count distribution as follows, out of 35 cases low platelet count is seen in 18 cases comprising up to 51.42%, normal platelet count is seen in 17 cases (48.57%). Out of 15 secondary dengue cases low platelet count is observed in 14 cases comprising up to 93% and normal platelet count was observed in 7% (n=1) cases. The finding is significant as the p value in the current study in association with platelet count and secondary dengue infection is $p=0.004671$ ($p<0.05$). Out of 12 cases of past dengue infection low platelet count is seen in a single case. The above analysis shows there is a significant association in low platelet count and secondary dengue infection which is an established fact. (Refer to table no:

Table no 1: Age distribution

| Age | Number | Percentage |
|----------|--------|------------|
| <1yr | 8 | 8.30% |
| 1-5yrs | 37 | 38.54% |
| 6-10yrs | 40 | 41.66% |
| 11-14yrs | 11 | 11.49% |
| Total | 96 | 99.99% |

Table 2: Distribution of IgM or IgG in dengue positive cases

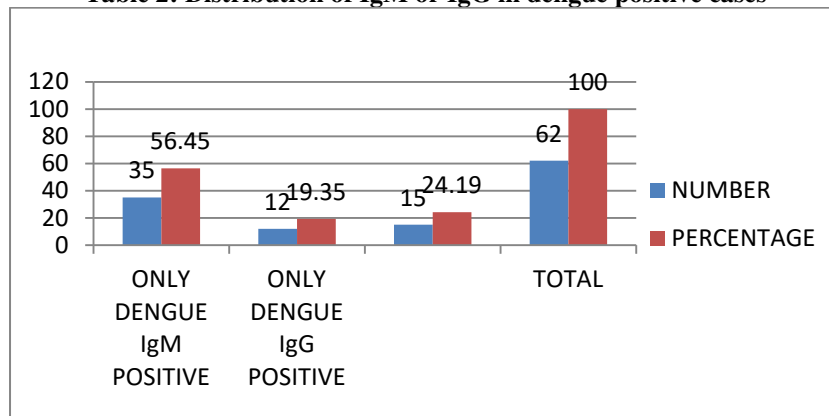
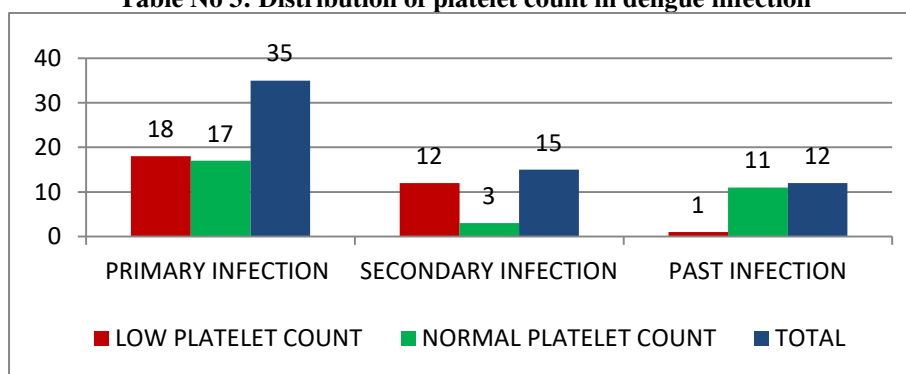


Table No 3: Distribution of platelet count in dengue infection



DISCUSSION

In the current study out of 96 symptomatic cases 62 (64.58%) were male children and 34 (31.25%) were female children. Among 62 dengue sero-positive cases 40(64.51%) were male children and 22(35.48%) were female children this shows male preponderance of the disease. The finding is correlating with studies conducted by Hussain W, Shaikh M et al and Anand R.1, Selvakumar L et al they reported male preponderance of disease with 76.3% and 59.01% respectively. (7,8)Maximum number of c ases were reported between age group 6-10yrs group comprising up to 41.66%, followed by1-5yrs (38.64%). Hussain W, Shaikh M et al in their study reported disease prevalence in <5yrs age group 48.4% and6-10yrs 43.0%. Anand R.1, Selvakumar L et al in their study reported mean age as 6.49 years.(7,8)Commonest chief complaint among the cases were fever (n=92 (95.8%)), followed by mayalgia (n=62(64.58%)). Anand R.1, Selva kumar L et al in their study reported Fever 96.7%, My algia in 47.5% which is correlating with current study.(8)Over all Sero-Prevalence of dengue antibodies in current study is 64.5%(n=62), which is correlating with study by Sinha B, Goyal N et reported 56.9% in

their article.(9) In the current study Sero-prevalence of dengue IgM and dengue IgG in acute febrile illness cases are 52.08%(n=50) and 28.12%(n=27).Out of 62 dengue positive cases, 15 (24.19%) were positive for both Dengue IgM and IgG antibodies, 35(56.45%) cases were positive for Dengue IgM and negative for Dengue IgG, 12(19.35%) cases were positive for Dengue IgG and negative for Dengue IgM. Out of 62 dengue positive cases 56.45% were presented with primary infection, 24.19% presented with past infection and 19.35% presented with secondary infection .Dr. Archana P. Nikam, et al in their study reported Primary dengue was detected in (63.27%) cases and secondary dengue infection was detected in (36.73%) cases. (10) Primary dengue cases out of 35 cases low platelet count is seen in 18 cases comprising up to 51%. Out of 15 secondary dengue cases low platelet count is observed in 12 cases comprising up to 81%. P value in the current study in association with platelet count and secondary dengue infection is p=0.004671 (p<0.05), which is significant finding to note. Out of 12 cases of past dengue infection low platelet count is seen in a single case. Chandola I, Sitara B,et al reported the similar finding in their study.(11)Secondary dengue infection

patients exhibited lower platelet count and prone for complications like DHF and DSS. Knowing the serological status of Dengue IgM and Dengue IgG will help us in identifying the type of infection and predicting the complications in early stages.

CONCLUSION

According to the current study knowing the serological status of dengue infection by both dengue IgM and dengue IgG antibody will help in identifying the type of infection, as there is a significant association between type of infection and platelet count, which in turn help in predicting the complications as earliest and helps in preventing the same.

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