Original article:

Correlation of Platelet count and diagnosis of dengue by NS1 antigen and IgM Elisa in tertiary care Hospital

[1]Dr.N.Gita,[2]Dr.Bhamare Sunil, [3]Dr.Khedkar Somnath , [4]Dr.N.P.Rao

[1]Chief Consulting Physician, Rao Nursing Home, Pune

[2]Assistant Prof of Microbiology , BJ Govt. Medical College, Pune

[3]Assistant Prof of Pathology, BJ Govt. Medical College, Pune

[4]Chief Consulting Physician, Rao Nursing Home, Pune

Corresponding author: Dr.N.Gita

Abstract:

Introduction: Dengue is observed as an acute condition febrile illness, noted as endemic to the India. Apart from the dengue specific parameters, platelet count is the only accessory laboratory test available in the peripheral areas that can support the diagnosis of DHF or DSS. Even in remote areas, platelet counts can be roughly estimated by microscopy. With this background present work was planned to study Correlation of Platelet count and diagnosis of dengue by NS1 antigen and IgM Elisa in tertiary care Hospital .

Material and methods: The present study work was done in Rao Nursing Hospital at Pune. Analysis of Dengue data from 1 Jan 2015 to 31 Dec 2015 was done. Samples send for the suspected cases of Dengue fever patients admitted in Hospital for NS1 antigen ELISA and IgM ELISA . In Addition Platelet Count of the Patients were analyzed . The sample size was determined with help of expert statistician. The cases confirmed as Dengue were included in present study while other suspected cases were rule out and excluded from present work.

Results: In our present study we collected platelet count in 329 patients with age mean range 42.20 (S.D. 12.91) . We found there is significant increased in platelet count after complete treatment . In severe cases there was done platelet transfusion (18.22 % cases) . 14.92 % cases were admitted in ICU. Diagnosis of dengue by NS1 antigen and IgM Elisa in tertiary care found statistically significant ($P < 0.01$)

Conclusion: We tried to correlate platelet counts in cases of fever with dengue. In 329 cases of dengue we recorded it at entry level and at discharge and we found it is useful parameter and statistically positive correlation was observed.

Keywords: acute febrile illness, dengue, platelet count

Introduction:

Dengue is observed as an acute condition febrile illness, noted as endemic to the India . It is caused by the Dengue virus, and is one of the most significant mosquito-borne listed viral diseases. [1,2] The Dengue virus (DENV) belongs to the family *Flaviviridae*, and it is transmitted to humans by the *Aedes aegypti* mosquitoes. It affects up to 100 million people annually, with 5,00,000 cases of dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS), and around 30,000 deaths, mostly among children. [3]

Currently the three basic methods used by most laboratories for the diagnosis of dengue virus infection are viral isolation, detection of the viral genomic sequence by a nucleic acid amplification

technology assay (Reverse transcription polymerase chain reaction (RT-PCR)), and detection of dengue virus-specific IgM antibodies by the IgM-capture enzyme-linked immunosorbent assay (MAC-ELISA) and/or the rapid dengue immunochromatographic test (ICT). [4] Apart from the dengue specific parameters, platelet count is the only accessory laboratory test available in the peripheral areas that can support the diagnosis of DHF or DSS. Even in remote areas, platelet counts can be roughly estimated by microscopy.[5] With this background present work was planned to study Correlation of Platelet count and diagnosis of dengue by NS1 antigen and IgM Elisa in tertiary care Hospital .

Material and methods:

The present study work was done at **Rao Nursing Hospital at Pune**. Analysis of Dengue data from **1 Jan 2015 to 31 Dec 2015** was done. Samples send for the suspected cases of Dengue fever patients admitted in Hospital for NS1 antigen ELISA and IgM ELISA . In Addition Platelet Count of the Patients were analyzed . The sample size was determined with help of expert statistician. The cases confirmed as Dengue were included in present study while other suspected cases were rule out and excluded from present work.

A total of 329 serum samples from equal number of clinically suspected dengue fever were collected.

Since our laboratory works round the clock, the samples were tested immediately for NS1, IgM and IgG by ICT-based tests.

The tests were performed strictly as per the declared manufacturer's instructions. Platelet counts of all the cases positive for any of the dengue parameter were noted . Platelet counts were also recorded in 329 cases of fever that were negative for any of the dengue parameter. The permutations and combinations of dengue-specific parameters were correlated with thrombocytopenia using standard error of proportions test. The count was done at admission , during follow up and at discharge.

Results:

Table 1)

	Jan -Dec 2015		
Month	**NSI**	**IgG**	**IgM**
Jan	43	40	44
Feb	40	54	44
Mar	34	0	34
Apr	37	0	37
May	38	0	38
Jun	39	0	39
Jul	50	0	50
Aug	112	0	112
Sep	134	41	128
Oct	231	92	217
Nov	238	55	219
Dec	153	18	158
TOTAL	1149	300	1120

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Table2) Platelet count during admission and discharge

	Platelet count during admission (Mean)	**Platelet count during discharge (Mean)**
IPD Patients	1,30 ,000/ml	1,67,000/ml
ICU Patients	42,000/ml	93,000/ml

In our present study we collected platelet count in 329 patients with age mean range 42.20 (S.D. 12.91) . We found there is significant increased ($P < 0.05$) in platelet count after complete treatment. In severe cases there was done platelet transfusion (18.22 % cases) . 14.92 % cases were admitted in ICU.

Discussion:

Detection of dengue-specific IgG/IgM has been the mainstay of diagnosis of DI. The dengue-specific antibodies begin to appear only around fifth day of fever in primary infection. 2 Even in most secondary infections, both the IgM and IgG type antibodies cannot be recorded before third day. [6] Therefore, there is always a window period, both in primary and secondary DI when only antibodies are tested. The new parameter, now available, for diagnosis of DI, the NS1 antigen, is detectable from day 1 of fever both in primary and secondary infections. It is important to note that NS1 is shown to be highly specific viral marker making it extremely reliable parameter for the diagnosis of DI from day 1 of the fever. 7

Platelet counts are decreased in several other conditions like some viral infections other than dengue, drug induced thrombocytopenia, collagen vascular diseases, idiopathic thrombocytopenia etc. 8

We therefore, tried to correlate platelet counts in cases of fever with dengue. In 329 cases of dengue we recored it at entry level and at discharge. And we found positive correlation .

This study has been carried out at a tertiary care teaching hospital. It is worth mentioning here that most tertiary care hospitals lack in viral culture setup. Therefore, applying gold standard tests in studies related to viral infections is out of reach of these centres. Dengue is an infection that is present in urban, semi-urban and rural areas. Our healthcare system is extremely resource poor. Top class technological backup is available only at very few elite laboratories situated in big cities. It is important to conduct studies in the peripheral centres where the laboratory has to function without great technological backup and still is expected to provide reasonable opinion to the clinician in the management of infections like dengue.9

The ease, speed and dependability of ICT make it an excellent tool in addressing this potentially fatal, epidemic prone infection that has become an important public health problem in our country. One can never forget the fact that dengue often breaks out in resource poor peripheral areas where ICT-based tests could be the only support available.

Conclusion:

We tried to correlate platelet counts in cases of fever with dengue. In 329 cases of dengue we recored it at entry level and at discharge. We found it as useful parameter and statistically positive correlation was observed.

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