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## A Clinicohaematological Profile and Role of Platelet Transfusion in Treatment of Dengue

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### ABSTRACT

**Aim:** Dengue is a chief health crisis also one of main common vector transmitted viral infection globally. Numerous factor have been ascribed to augmented illness and death with distorted hematological and coagulation factors having more influence. The current work was done to investigate the hematological indices and associate with the clinical outcome, also to assess the importance and requirement of platelet transfusion and its outcome.

**Methodology:** 50 patients admitted in Department of general medicine, in association with department of pathology, Saveetha Medical College, Thandalam, Chennai with fever and serological positive cases were included. Statistical analysis was done for the various parameters as per requirement Using SPSS software.

**Results:** Among fifty patients included in our study, almost all patients presented with fever and headache .Myalgia, was one another common presenting complaint. Leukopenia identified in 70% of patients. , NLR ratio was reversed in 28% of patients. Platelet transfusion was required in 42 patients. Mostly patients took 3 days to recover after platelet transfusion.

**Conclusion:** As per our study presence of fever with headache, NLR ratio reversal, decreased platelet count and WBC count. Also clinical features related to capillary leak and increase in hematocrit should always give us solid thought of dengue fever. Platelet transfusion in patients diagnosed with moderate to severe thrombocytopenia demonstrated to be beneficial for suave rescue of the patient

**Keywords:** Dengue, Thrombocytopenia, Platelet transfusion

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## INTRODUCTION

Globally the presentation and epidemiology of dengue fever is fluctuating to different extent. In India of the late the disease has inaccurate its progression exhibiting as dengue hemorrhagic fever and with rise in number of epidemic bursts. Blood values like Hemoglobin level, total and differential white blood cell count and platelet count are abnormal. The utmost encountered blood features was thrombocytopenia with concomitant haemoconcentration.

A guide for investigation, management and control of Dengue fever has been and published by Technical Advisory Committee on Dengue Hemorrhagic fever by WHO<sup>1</sup>. The criteria to confirm the diagnosis of dengue are mainly four 4 Major indicators - fever, hemorrhagic signs, enlargement of liver and predisposition to develop shock, along with alteration in lab indices particularly - thrombocytopenia and coexisting haemoconcentration. This has used as a proven method for practical usage in routine screening as it find out 95% of risk cases. Other significant lab indices are decrease in white blood cells, increased lymphocytes along with reactive lymphocytosis, also associated with defect in capillary permeability and abnormal liver enzymes

Atypical immune over stimulation along with virus prompted harmfulness influence the disease progression. Abnormal immune over stimulation along with impairing virus clearance from host also causes increased release of cytokines like tumor necrosis factor that affect monocytes, endothelial cell and hepatocyte utilities.<sup>2</sup>

Dengue virus prompted coagulopathy and vasculopathy along with concomitant inhibition of Megakaryopoiesis and apoptotic death of early megakaryocytes progenitors also subsidize to the pathogenesis of disease. A secluded platelet count of <50,000/ $\mu$ l is related with slight risk of bleeding till the platelet count falls less than 1000-20,000/ $\mu$ l. There is augmented risk of bleeding when linked with concomitant coagulopathies, liver disease, antiplatelet drugs and other infection. The lowest starting point for platelet transfusion is

<10,000/ $\mu$ l in patients who are stable otherwise.<sup>3</sup>

Nowadays dengue has put itself as commonest mosquito speeded viral infection globally. Prompt diagnosis and early commencement of management and platelet transfusion in specified cases are vital if disease associated morbidity and death are to be controlled. Based on this intention of our research work is to investigate the hematological indices and to associate above indices with the clinical outcome. Also to assess the part of platelet count in envisaging consequence in dengue affected patients and to evaluate the requirement of platelet transfusion among microbiologically positive patients.

#### **MATERIALS AND METHODS:**

The present research work was done as descriptive retrospective study in the Department of Pathology, Saveetha Medical College. Clinically doubted patients of dengue admitted in department of general medicine, they were monitored from the day one to recovery or discharge. This work was carried on from data for a period of two years. Study was started after getting permission from institutional ethics committee.

Data of all microbiologically positive patients for IgM and NS1 who are above 12 years of age were included in the study. Whereas doubted dengue patients who are negative on lab investigation also if positive for some other infection along with dengue were excluded. Patient's clinical data were assorted from their case sheet and with a standard questionnaire.

Clinical indices including platelet count and all required blood parameters were collected and recorded. Peripheral smears were made and stained with Leishman's stain, results were noted. Mean, Standard deviation and Statistical parameters are calculated by utilizing statistical analysis software SPSS Version 24. Suitable tests of analysis are analyzed.

## RESULTS:

In our study totally there were 50 serologically positive patients. Among which 16 percent of cases were in the age group of less than 20 years. The distribution was equal with 13 patients in age group of both 21 to 30 years and 31-40 years, rest was above age group of 40 years. In our study 30 patients were men and rest 20 were women with men being commonly affected. Clinically, in our study 29 patients had dengue fever and 21 had dengue hemorrhagic fever.

In our study 13 patients had fever for five days, 17 had fever for six days while 12 had fever for seven days and rest had more than seven days with 5-6 days being more common in our study population.

Most common symptom on presentation was headache present in all patients followed by myalgia in 43 patients, other symptoms like retro orbital pain and arthralgia was also present in few cases. Other system involvement was there with 14 patients presenting with either LRTI or URTI. Also in our study abdominal colic was present in fourteen cases, nausea and vomiting in twenty cases .On ultra-sonogram liver enlargement was seen in 26 patients and spleen enlargement in 24 patients. One patient presented with major bleeding diathesis. While 8 had minor bleeding symptoms and rest had none. Also in our study pleural effusion and ascites was seen in few cases.

On serological examination in our study, IgM was positive in thirty eight percent of cases and along with NS1 it was positive in twenty one cases. (Table-I). In the fifty cases studied the mean values of hemoglobin was 9.91 with a S.D value of 1.71, PCV was 36.25 with a S.D of 6.28, WBC count was 7438.80 with a S.D value of 252.The platelet count mean was 73006.74 with a S.D value of 5672 .(Table II)

**Table-I: Distribution of patients according to serological examination**

Serology examination	Number	Percentage (%)
NS1	0	0%
IgM	29	58%
NS1+IgM	21	42%

On blood investigation for different parameters twenty-four cases had anemia with a mean value of 9.91 gm/dl, seventy percent of cases had leukopenia with a mean value of 7438 cells/cu.mm and almost 48 patients had thrombocytopenia with different grading based on their platelet count. The mean platelet count in our study was 73006 cells/cu.mm. Coming to grade of thrombocytopenia in the 50 patients studied 48 patients show thrombocytopenia. In our study twelve patients had less than 25000 of platelet count, 22 had count between 25000 to 50000, five patients had count between 50000 to 75000. Rest 12 patient had count ranging from 75000 to 150000. (Table II)

**Table II: Grading of thrombocytopenia**

Grading based on cell/cu/mm	Number	Percentage (%)
75000-150000	12	25%
50000-75000	5	11%
25000-50000	22	46%
< 25000	9	18%

On peripheral smear examination along with thrombocytopenia, anemia was seen in eight cases, leukopenia was seen in 18 cases while all three were seen in 6 cases

Among 48 patients with thrombocytopenia 43 patients required platelet transfusion. Among which transfusion was needed in 2 patients on first day of admission itself. Coming to

number of units required most of patients i.e 27(54%) were given 1-2 units, 5 cases required 3-4 units, 8 cases needed 5-6 units, rest three patients required more than 7 units .

Finally we analyzed the time taken for platelet count to return to normal after transfusion and predominantly it took three days in our study with 23 had their platelet level returned back to normal by then , rest of the patients it different time periods ranging up to 6 days (Table – III)

**Table III: Number of days for improvement in platelet count**

Number of days	No of patients	Percentage (%)
Two	5	11%
Three	23	54%
Four	7	17%
Five	5	11%
Six	3	7%

We also observed the time take to completely recover from illness and predominantly 90 percent took one – two weeks to recover. Four patients recovered in less than a week and only one took more than two weeks to recover.

## **DISCUSSION:**

Dengue fever still is one of the significant mosquitos borne infection with major health and financial implication. The clinical presentation ranges from classical viral fever to as complicating as dengue hemorrhagic syndrome combining with shock viral syndrome. Timely identification and insistent treatment particularly for DHF and DSS is still the basis for good management.

In our study a total of 50 serologically confirmed dengue positive patients were included. The mean age of our study population was 38 years. Nadeem et al.<sup>4</sup> did a study in which average age was 36 years, and it is 34.7 years in a study done by KN Tiwari et al.<sup>5</sup>

In our study 30 patients were men and rest 20 was women with men being commonly affected which was similar to other studies. In Nadeem MA et.al<sup>4</sup> study the male: female ratio 70:30. In study done by Raju BJ et.al<sup>6</sup> the ratio is 60.5%: 39.5%.

Similarly to studies by Turbadkar D et .al,<sup>7</sup> Mandal SK et. Al<sup>8</sup> in our study too all patients presented with fever. Similarly to other studies like in Raju BJ et. al<sup>6</sup>, Lt .Col. Banerjee et .al<sup>9</sup> , in our study too headache was present in all cases , retro orbital pain is main characteristic of Dengue fever and it was present in 14% of patients in our study. In a study done by Raju et.al<sup>6</sup> 26.5% of patients presented with retro orbital pain. Study done by Raju et.al<sup>6</sup> had 85.5% of patients presenting with myalgia while it was 86 percent in our study,

In a study done by Khan et al<sup>10</sup> 35 percent of patients presented with associated URTI while in our study it was 28 percent which include both LRTI and URTI. Similarly in contrast to few studies done by Raju et.al<sup>6</sup> with presentation in 55% of cases and Tiwari KN et.al<sup>5</sup> with 34% cases , our study had 24% presenting with abdominal pain.

Presence of capillary leak is the characteristic of DHF and DSS .The three frequent findings are a increasing hematocrit, presence of ascites and pleural effusion. Eight patients had pleural effusion in our study. Fatima S et.al<sup>11</sup> study had an prevalence of 19% of ascites, it was 26 percent in our study. Raju BJ et.al<sup>6</sup> reported an incidence of 21.5%. Considerable increase in hematocrit present in 16 percent in our study and it was very high (73%) in a study done by Fatima et.al<sup>11</sup>.

Coming to serological diagnosis in our study 29 (58%) were IgM only positive and the rest 21(42%) were both NS1 and IgM positive. Bandyopadhyay B et.al<sup>12</sup> in his study revealed that 24 of 64 patients were positive for both similar to our stud. . This may be due to

secondary dengue infection where the IgM titers occasionally become untraceable. Fatima S et.al<sup>11</sup> study also had similar results.

Similar to study done by Lin SF et.al<sup>13</sup> where the incidence of leucopenia was 76%, our study only had 70 percent of patients with leucopenia in patients with dengue fever.

Thrombocytopenia was observed in 48 patients (96%) in our study, Coming to grade of thrombocytopenia in the 50 patients studied 48 patients show thrombocytopenia. In our study twelve patients had less than 25000 of platelet count, 22 had count between 25000 to 50000, 5 had count between 50000 to 75000.Turbadkar D.et.al<sup>[7]</sup> reported an occurrence of 76.74% while Fatima S et.al<sup>[11]</sup> reported 89% which is less than our study.

The solitary reason for platelet transfusion in dengue patients is presenting with moderate to severe thrombocytopenia. This was proven by study done by Tiwari KN et.al<sup>5</sup>. In his study 56.5% of patients required platelet transfusion where as in our study 86% required platelet transfusion and moreover in our study to the main indication being thrombocytopenia.

Coming to platelet transfusion mostly patients required one to two units and ranged from 1-12 units. In our study average units of platelets transfused is 2.42 units .It also had influence as patients who had transfusion stayed for longer periods. The reason behind this is only patients who are clinically on lower level needed transfusion. This was similar to study done by Tiwari KN et al<sup>5</sup> In a study done by Kulkarni et al<sup>14</sup> the need of number of units was dependent on platelet count.

In our study population even though no patients presented with dengue shock syndrome, 58 percent had dengue fever and rest 42 percent had dengue hemorrhagic fever. In a study done by Fatima et.al<sup>11</sup> 60% had dengue fever, 35.5% had dengue hemorrhagic fever and 4.5 % had dengue shock syndrome. One another study done by Saqib et .al<sup>15</sup> had 78% with dengue fever, 17% with DHF and rest 5% with DSS. A study done in Tamilnadu by

Khan DM et al <sup>10</sup> revealed that 54.2 percent had DF, 35.5 percent had DHF and 10.2 percent had DSS.

## **CONCLUSION:**

Generally presence of symptoms like fever with headache along with thrombocytopenia, leukopenia and reversal of NLR ratio must always dealt with doubt of Dengue fever and intensive screening will be required. Features like increased, ascites and pleural effusions should warrant aggressive treatment. Platelet transfusion, is needed in patients presenting with moderate to severe thrombocytopenia. In conclusion prompt suspicion, screening, diagnosis and apt treatment of Dengue fever will efficiently decrease morbidity or mortality associated to this deadly disease. .

## **CONFLCIT OF INTREST: NIL**

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