Prospective Study of Thrombocytopenia in Patients of Malaria in a Teritiary Care Hospital.

Dr. K. Mohan Rao¹, Dr. R. Kishore Kumar², Dr. S. Padma Sravani³, Dr. R. V. S. N. Ramachandrudu⁴, Dr. R. Ashalatha⁵, Dr. J. Srujani⁶

¹ Associate professor, Department of General medicine, GGH, Anantapuramu,
² Assistant professor, Department of General medicine, GGH, Anantapuramu,
³ Assistant professor, Department of Pharmacology, GMC, Anantapuramu,
⁴ Associate professor, Department of Pharmacology, GMC, Anantapuramu,
⁵ Associate professor, Department of Pharmacology, GMC, Anantapuramu,
⁶ Postgraduate in Department of Pharmacology, GMC, Anantapuramu.

Corresponding Author : S. Padma Sravani

Abstract: Malaria is a protozoal disease caused by infection with parasites of the genus Plasmodium to man by certain species of infected female Anopheline mosquito. In 2017, there were 9.5 million cases in India. Haematological abnormalities have been observed in patients with malaria, anaemia and thrombocytopenia being the most common. We conducted a study to find out the frequency and degree of thrombocytopenia in patients with malaria in a tertiary care hospital. In our study, 210 patients with malaria positive were investigated for platelet count.

RESULTS: In our study 115 patients, 65 (56.51%) were positive for Plasmodium vivax, 45 (39.13%) were positive for Plasmodium falciparum and 5 (4.5%) had mixed infection with both P. falciparum and P. vivax. Out of 65 cases detected with vivax malaria, 48 cases had thrombocytopenia. Out of 45 cases detected with falciparum malaria, 35 cases had thrombocytopenia. Among 5 cases of mixed infection, 4 cases had thrombocytopenia.

CONCLUSIONS: Presence of thrombocytopenia in a patient with acute febrile illness in the tropics increases the possibility of malaria. The above finding can have therapeutic implications in context of avoiding unnecessary platelet transfusion in malaria patients.

Key words: Malaria, Plasmodium falciparum, Plasmodium vivax, Thrombocytopenia

I. Introduction

Malaria is a protozoal disease caused by infection with parasites of the genus Plasmodium and transmitted to man by certain species of infected female Anopheline mosquito. Five species of Plasmodium (Plasmodium vivax, Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale and Plasmodium knowlesi) cause malaria in humans. In India, about 27% of the population lives in malaria high transmission area and 58% in low transmission area (1). In 2008, there were 1.52 million cases of malaria in India, out of which 0.76 million case of P. falciparum, compromising 50% of total malaria cases. There were 924 deaths from malaria (2). A typical attack of malaria comprises three distinct stages: cold stage, hot stage and sweating stage. The clinical features of malaria vary from mild to severe and complicated, according to the species of parasite present, the patient’s state of immunity, the intensity of infection and also presence of concomitant conditions such as malnutrition and other diseases. Malaria parasite affects multiple organs in the body such as liver, spleen, brain, gastrointestinal tract, gall bladder, pancreas, blood vessels and placenta. Hence, clinical picture could be of wide spectrum ranging from simple malaria to life-threatening central nervous symptoms like coma. Haematological abnormalities have been observed in patients with malaria, anaemia and thrombocytopenia being the most common (3, 4). A number of observational studies have confirmed the association of thrombocytopenia to malaria. Both immunological and non-immunological destruction of platelets have been implicated in causing thrombocytopenia. The speculated mechanisms are coagulation disturbances, sequestration in spleen, antibody-mediated platelet...
Prospective Study Of Thrombocytopenia In Patients Of Malaria In A Tertiary Care Hospital.

Destruction, oxidative stress and role of platelets as cofactors in triggering severe malaria. Abnormalities in platelet structure and function have been described as a consequence of malaria and in rare instances platelets can be invaded by malaria parasites. (5, 6, 7). We conducted this study to find out the frequency and the degree of thrombocytopenia in patients with malaria in tertiary care hospital.

II. Material And Methods

The blood were carried out in government general hospital, Anantapuramu, Andhra Pradesh. This prospective study was carried out from 2/1/2016 to 11/12/2017. A total of 210 patients were included in our study, that were found the positive for malaria parasite. Malaria test was carried out by thin and thick smear examination. Thin smear was stained by leishman stain and thick smear was stained by field stain. In field stain polychromated methylene blue and eosin stains specifically to basophilic and acidophilic cellular elements to demonstrate blood cells and hemoparasites. All patients undergone for complete blood count by “ABX pentra DF120” a fully automated hematology analyser by horiba.

Data analysed by excel sheet. Grading of thrombocytopenia was carried out according to NCI Common Terminology Criteria for Adverse events Version 3.0. (8)

According to the patients with thrombocytopenia have been divided into following five grades: Grade 0: With in normal limit, platelet count 1,50,000 or above
Grade 1: Platelet count between 1,50,000 and 75,000
Grade 2: Platelet count between 75,000 and 50,000
Grade 3: Platelet count between 50,000 and 25,000
Grade 4: Platelet count less than 25,000

III. Results

In our study, 115 patients with malaria positive were investigated for platelet count. Out of 115 patients, 68 (65.22%) were males and 37 (34.7%) were females. Age of patients was between 1 year and 60 years with majority of patients between 15 years and 40 years of age (comprising about 56%) [Table 1].

A total of 21 (27.3%) patients were belonging to paediatric age group [table 1]. Mean haemoglobin value was 12.0 ± 2.1 g% (ranging from 6.1 g% to 15.2 g%) and mean white blood cell count was 12,000 ± 13,000/cu mm (ranging from 2,800 to 19,400/cu mm). Mean platelet count was 151,000 ± 50,000/cu mm (ranging from 11,000 to 313,000/cu mm).

All the patients had fever (100%) at the time of presentation, followed by weakness (95%), nausea (90%), vomiting (86%), anorexia (80%) and diarrhea (5%). Most common sign was anaemia (80%) followed by splenomegaly (20%), jaundice and mortality was not seen [Table 2].

Table 1:

<table>
<thead>
<tr>
<th>Age(in years)</th>
<th>Male(%)</th>
<th>Female(%)</th>
<th>Total(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14</td>
<td>20(17.39)</td>
<td>12(10)</td>
<td>32(27.3)</td>
</tr>
<tr>
<td>15-25</td>
<td>25(21.73)</td>
<td>14(11.73)</td>
<td>39(33.4)</td>
</tr>
<tr>
<td>26-40</td>
<td>5(13.04)</td>
<td>10(9.13)</td>
<td>25(22.17)</td>
</tr>
<tr>
<td>41-60</td>
<td>5(13.04)</td>
<td>14(3.91)</td>
<td>19(16.95)</td>
</tr>
<tr>
<td>Total</td>
<td>75(65.5%)</td>
<td>40(34.5%)</td>
<td>115(100)</td>
</tr>
</tbody>
</table>

Frequency of clinical features in malaria:

<table>
<thead>
<tr>
<th>Symptoms/signs</th>
<th>Clinical features</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>115</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Weakness</td>
<td>109</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td>103</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Signs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaemia</td>
<td>92</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Anorexia</td>
<td>92</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Splenomegaly</td>
<td>23</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Jaundice</td>
<td>11</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2:
Prospective Study Of Thrombocytopenia In Patients Of Malaria In A Teritiary Care Hospital.

Fig 1. Thrombocytopenia grading in P. vivax malaria. Grade I represents 10 (8.6%) cases, Grade II represents 12 (10.8%) cases, Grade III represents 19 (17.3%) cases, Grade IV represents 9 (6.5%) cases.

Fig 2. Pie diagram represents the thrombocytopenia in P. falciparum malaria. Grade I represents 10 (6.5%) cases, Grade II represents 13 (8.6%) cases, Grade III represents 22 (15.17%) cases. No cases detected in Grade IV.

In the study group of 115 patients: 65 (56.5%) were positive for plasmodium vivax, 45 were positive for plasmodium falciparum, and 5 had mixed infection with both plasmodium vivax and falciparum. Out of 65 cases detected with vivax malaria, 48 cases had thrombocytopenia, 17 cases had normal platelet count, 10 cases had grade I thrombocytopenia, 12 cases had grade II thrombocytopenia, 19 cases had grade III thrombocytopenia, and 9 cases had grade IV thrombocytopenia.

Out of 45 cases detected with falciparum malaria, 35 cases had thrombocytopenia, 10 cases had normal platelet count, 10 cases had grade I thrombocytopenia, 13 cases had grade II thrombocytopenia, 22 cases had grade III thrombocytopenia, and no cases had grade IV thrombocytopenia. Among 5 cases of mixed infection, 4 cases had thrombocytopenia, 1 case had normal platelet count, 3 cases had grade I thrombocytopenia. No cases had grade II thrombocytopenia, 1 case had grade III thrombocytopenia, and no cases had grade IV thrombocytopenia.

IV. Discussion

Malaria caused by P. vivax and P. falciparum is endemic in many parts of India. Malaria affects almost all blood components and is a true hematalogical disease. Thrombocytopenia and anaemia are the most frequently associated haematological complications. In endemic areas, malaria has been reported as the major cases of low platelet counts, this is so characteristic of malaria, that in some places it is used as an indicator of malaria in patients presenting with fever. Platelet count of less than 1,50,000 /cumm increases the likelihood of malaria 12-15 times. (9,10,11)
In our study, we found more significant thrombocytopenia in *P. vivax* malaria. More cases of thrombocytopenia in *vivax* malaria infection may attribute to possible development of a new genotype of *p.vivax* [17]. Recent studies have shown that thrombocytopenia is equally or even more common in *p.vivax* malaria contrary to the popular belief that it may be observed in *p.falciparum* malaria [21,22,23,24,25]. More recent studies conducted from the Indian subcontinent have found significant thrombocytopenia in *p.vivax* malaria [29,30]. Studies from Qatar and Venezuela had shown similar results [31,32].

There is no matched control group. This is one of the limitation of the study.

**V. Conclusion**

Higher frequency of mild to severe thrombocytopenia was observed in patients suffering from malaria. The above findings can have therapeutic implications in context of avoiding unnecessary platelet infusion in malaria patients. Presence of thrombocytopenia in a patient with acute febrile illness in tropics increases the possibility of malaria. This may be used in addition to the clinical and microscopic parameters to the heighten the suspicion of this disease and prompt initiation of the treatment.

**References**


**Prospective Study of Thrombocytopenia In Patients Of Malaria In A Tertiary Care Hospital.**
Prospective Study Of Thrombocytopenia In Patients Of Malaria In A Teritiary Care Hospital.


