

## FREQUENCY OF THROMBOCYTOPENIA IN PLASMODIUM VIVAX MALARIA

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### ABSTRACT

**Objective:** To determine the frequency of thrombocytopenia in *Plasmodium vivax* (P.vivax) malaria cases at two hospitals.

**Study Design:** Cross-sectional descriptive study.

**Place and Duration of Study:** The study was conducted at the departments of Pathology, Combined Military Hospitals Malir and Sibi, Pakistan from Jul 2011 to Mar 2012.

**Patients and Methods:** A total of 2709 samples were collected from febrile patients for detection of malaria parasite (944 from CMH Malir and 1765 from CMH Sibi). Cases having infection with *P. falciparum* alone or having mixed infection with *P. vivax* and *P. falciparum* were excluded from the study. Both thick and thin film microscopy and immunochromatographic method (OptiMAL-IT) were used for detection of malarial parasite. Platelet counts were done using automated haematology analyser (Sysmex KX 21) with re-evaluation of low counts with manual methods.

**Results:** Total of 170 patients were found positive for *P. vivax* malaria (44 from CMH Malir and 126 from CMH Sibi). Platelet counts ranged from 21 - 457 × 10<sup>9</sup>/l with a mean of 134 × 10<sup>9</sup>/l. Ninety five (2.1%) from CMH Malir and 4.2% from CMH Sibi out of 170 patients had thrombocytopenia, and the difference in thrombocytopenia at the two hospitals was insignificant (0.017).

**Conclusion:** Thrombocytopenia in patients with *P. vivax* infection is equally prevalent in the two hospitals, representing a widely different geographical area and should prompt a more thorough search for malarial parasite.

**Keywords:** Malaria, *Plasmodium vivax*, Thrombocytopenia.

### INTRODUCTION

Malaria is still one of the most prevalent infectious diseases of the world. There were an approximate 216 million cases of malaria with 655,000 deaths in 2010 worldwide<sup>1</sup>. *Plasmodium vivax* malaria is prevalent in many regions of the world. It accounts for more than half of all malaria cases in Asia and Latin America. Majority of cases in Pakistan are due to *P. vivax*. Thrombocytopenia and anaemia are the most common hematological abnormalities observed in malaria and mostly documented in infection with *P. falciparum*. This study attempts to compare and highlight the high incidence of thrombocytopenia associated with *P. vivax* infection in two different hospitals. There is not much literature to emphasize on the subject in

our region.

### PATIENTS AND METHODS

This study was conducted from July 2011 to March 2012 in the departments of Pathology Combined Military Hospitals (CMH) Malir Karachi and Sibi. All consecutive patients with fever of acute onset without localizing signs were considered for study. Malarial Parasite (MP) examination using thick and thin smears stained with Leishmann's stain were done on 2709 samples (944 in CMH Malir and 1765 in CMH Sibi) from patients suspected of malaria. Patients with *Plasmodium vivax* on peripheral blood film were included in the study only after further analysis by immunochromatographic method using OptiMAL rapid malaria test to confirm and to positively identify the species. Platelet counts along with other haematological parameters were done using automated haematology analyser Sysmex KX21. Normal platelet count was considered between 150000-450000/ul. Patients

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with low platelet counts were re-evaluated by manual methods. Patients whose fever could be localized, thrombocytopenia attributable to a known existing cause, coagulation disorder, dengue fever, those with a history of drug intake or patients identified as having mixed or falciparum malaria were excluded from the study.

## RESULTS

A total of 2709 patients were subjected to malaria testing during the study period. Only 170 patients were found positive for *P. vivax* malaria (44 from CMH Malir and 126 from CMH Sibi). Platelet counts ranged from 21 – 457 × 10<sup>9</sup>/l with a mean of 134 × 10<sup>9</sup>/l. Ninety five out of 170 patients had thrombocytopenia. These included 20 of 44 (45.45%) cases from CMH Malir and 75 of 126 (59.52%) cases from CMH Sibi. The data from the two hospitals was statistically not different ( $p = 0.107$ ). Platelet count in these 95 thrombocytopenic patients ranged from 21 – 143 × 10<sup>9</sup>/l with a mean of 99.5 × 10<sup>9</sup>/l.

## DISCUSSION

Malaria is one of the most common causes of acute febrile illness in our country. Haematological findings like thrombocytopenia<sup>2</sup> and anaemia<sup>3</sup> are common. Search of literature reveals various levels ranging from 43 to 75%<sup>4-9</sup> of thrombocytopenia, leading to a general consensus that thrombocytopenia is common in malaria<sup>10-12</sup> but they are all centred around *P. falciparum* related or mixed malarial infections<sup>13</sup>.

Organ dysfunction seen in *P. falciparum* malaria is not seen in *P. vivax* infections. Thus, severe malaria is reported frequently with *P. falciparum* but rarely with *P. vivax* infection. Eleven cases of severe *Plasmodium vivax* malaria were studied in Bikaner (western India)<sup>14</sup>. These patients exhibited cerebral malaria, renal failure, circulatory collapse, severe anemia, thrombocytopenia, hemoglobinuria, abnormal bleeding, acute respiratory distress syndrome, and jaundice. Isolated *P. vivax* malaria can give rise to thrombocytopenia not very infrequently<sup>15-17</sup> as is also evident from our study. In the study

conducted at the Aga Khan University Hospital in 2009, out of 97 patients with *P. vivax* infection, 88 had thrombocytopenia (89%)<sup>18</sup>. Another study from Jinnah Post Graduate Medical centre (JPMC) Karachi determined the frequency of thrombocytopenia in 124 malaria positive cases. Fifty six out of 60 (93.33%) *P. vivax* malaria patients had thrombocytopenia. In our study 59.52% cases of *P. vivax* from CMH Sibi and 45.45% from CMH Malir were associated with low platelet count and statistically the results of these two hospitals was not significant ( $p = 0.107$ ). *P. vivax* infection related thrombocytopenia can be severe rarely<sup>19,20</sup>. In an African study on children, among 298 patients diagnosed with malaria, 18 had various manifestations of severe *P. vivax* malaria including platelet count of < 50,000/ $\mu$ L<sup>21</sup>. The literature is generally lacking in our region emphasizing this aspect. The main emphasis in our study is that despite differences in geography, climate and ethnicity the common finding of thrombocytopenia is prevalent in both the regions with no statistical difference.

## CONCLUSION

Thrombocytopenia is equally prevalent among case of *plasmodium falciparum* and *plasmodium vivax* malaria in Pakistan. All cases clinically presenting with fever and thrombocytopenia need to be checked for both *plasmodium vivax* and *plasmodium falciparum* infection.

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