



## Raised PDW Common Hematological Parameters as a Prognostic & Recovery Survival Index of Plasmodium Vivex Malaria for Acute Disease

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### Abstract

**Aims & Objectives:** Improve the survival rate of patients. Reduced the morbidity and mortality of malaria due to plasmodium vivex Reduced the incidence of plasmodium vivex induced acute illness and prevent the complication.

**Material & Methods:** Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol .A complete blood counting including HB%, PCV, Red cell indices, platelet count with platelets indices PDW and total white cell count and differential was done by Automated blood cell counter and peripheral blood smear examination by thin film and thick film. The all cell count indices including RBC, WBC count with differential along with platelets count was further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B stain and leishman stain.

**Conclusion:** Thrombocytopenia is one of the common complications of acute illness of the P. vivax malaria. After the Thrombocytopenia, raised platelets distribution width is a as prognostic tool and recovery survival index after acute illness p.vivex malaria.

**Keyword-** platelets distribution width, Thrombocytopenia.

### MATERIAL & METHODS

**Study area and design-** The present study was conducted at the Department of medicine and pathology curewell hospital Pvt Ltd Indore mp. The study was designed as a observational hospital based study.

**Ethical Consideration-** Blood was collected in a sterile EDTA containing tube and processed following our established hospital based laboratory protocol then generate the report of each patient. Take informed consent was obtained from all study participant for use of your blood sample for medical research after doing physician request investigating and generate the report. Start proper management as a guide line.

**Patient's Selection Criteria-** The study target those patients who's present with complain of fever with chills rigger. Blood sample pathology report shows plasmodium vivex malaria positive. We include both OPD and IPD patients with all age groups, male and female both gender for study. Sample size is 100 patients.

### COMPLETE BLOOD COUNT (CBC) AND PERIPHERAL SMEAR.

#### Materials

Purple vacutainer tube or capillary collector (EDTA) ethylenediaminetetraacetate, Slides and blue capillary tube, Needle or lancet, Vacutainer holder, Alcohol swab, Cotton balls, Absorbent

materials, Slide case and hematological cell counter.

**Procedure**

1. Specimen is collected into EDTA (purple) vacutainer. (5 or 7ml volume)

- Step 1. A small drop of venous blood is placed on a glass microscope slide, using a glass capillary pipette.
- Step 2. A spreader slide is positioned at 45° angle and slowly drawn toward the drop of blood.
- Step 3. The spreader slide is brought in contact with the drop of blood and is being drawn away.
- Step 4. The spreader slide is further pulled out, leaving a thin layer of blood behind.
- Step 5. The blood smear is nearly complete.
- Step 6. End result will be a glass slide with a well-formed blood film. After drying for about 10 minutes, the slide is fixed in methanol & stained with field A and B stain.

Then the run the sample in hematological cell counter and generate PDW data.

Platelet count in the blood can be rapidly measured using an automated haematologic analyser. Platelet indices are biomarkers of platelet activation. They allow extensive clinical investigations focusing on the diagnostic and

prognostic values in a variety of settings without bringing extra costs. Among these platelet indices, plateletcrit (PCT), mean platelet volume (MPV), and platelet distribution width (PDW) are a group of platelet parameters determined together in automatic CBC profiles; they are related to platelets’ morphology and proliferation kinetics. PDW is an indicator of volume variability in platelets size and is increased in the presence of platelet anisocytosis <sup>(17)</sup>. PDW is a distribution curve of platelets measured at the level of 20% relative height in a platelet-size distribution curve, with a total curve height of 100% <sup>(18)</sup>. PDW directly measures variability in platelet size, changes with platelet activation, and reflects the heterogeneity in platelet morphology <sup>(13,20)</sup>. Under physiological conditions, there is a direct relationship between MPV and PDW; both usually change in the same direction <sup>(20)</sup>. Meanwhile, there are conflicting reports in the literature about the relationship between platelet volume and numbers, which suggests that they are affected by different mechanisms <sup>(5,21-25)</sup>.

**Hematological Examination**

Hematological Examination including HB%, PCV, Red cell indices, platelet count and total white cell count with differential count should be done on peripheral smears stained with field A and B stains.

**OBERVATION & DISCUSSION**

Plasmodium Vivex	VALUE	Prognosis	Total Cases (n=100)	
			No.	%
PDW high	17-20 %	Poor prognosis	63	63.00%
PDW normal	Between 15- 16 %	Good prognosis	36	36.00 %
PDW low	<14%	Not significant	01	01%

Plasmodium Vivex	Type of severity	Total Cases (n=100)	
		No.	%
PDW high	acute illness	63	63 %
PDW normal or low	Non acute illness	37	37 %

This study comprised 100 individuals (67 male and 33 female). Blood samples were collected by venipuncture in tubes containing EDTA

anticoagulant (ethylene diamine The platelet indices were analyzed in whole blood using a blood cell counter The factorial ANOVA model

with Tukey's test was used for statistical analysis and an alpha error of 5% (p-value < 0.05) was considered acceptable. The values for PDW were 15.4 TO 16.6 % which are similar to the mean values quoted in the literature.<sup>(4)</sup> In relation to gender, significant differences were observed only for the PCT levels. In regards to age, there were significant differences in the values for the three platelet indices comparing the under 10-year-old age group to the other age groups except for the all age group.

Data analysis in following hematological parameters with the difference under the Extended Mantel-Haenszel test for trend of chi –Squares test. Chi-sq. test X2 Value =0.873 [DF = 1] 2-sided P = 0.350 For trend in a given direction: P = 0.175

## CONCLUSION

*P. vivax* monoinfection presented with thrombocytopenia and raised PDW suggesting that acute illness<sup>1,2</sup>. *P. vivax* malaria has now clearly emerged as a potentially lethal condition<sup>11,21</sup> despite of having previously been (platelet count <20×10<sup>3</sup>/mm<sup>3</sup>) is a common manifestation in patients with *vivax* mono-infection confirmed by PCR<sup>15, 16</sup>. thrombocytopenia in malaria seems to be a multifactorial phenomenon and probably involves an increase in platelets destruction and consumption<sup>7,8-10</sup>.

*P. vivax* revealed a high frequency of thrombocytopenia and raised PDW. The high frequency of warning signs of severe malaria cases can be explained by the fact that this study was conducted in a reference hospital for malaria diagnosis and treatment. to that reported<sup>11</sup> <sup>12</sup> regarding patients infected with *P. vivax* in the Amazon region. Increased PDW in malaria has been observed in other studies maskar as acute illness.<sup>13,14</sup>.

It is well known that non-immune individuals are more susceptible to developing severe malaria. Furthermore, the delay of onset of malaria treatment is directly associated with severe disease outcomes<sup>15</sup>. Raised PDW predominated in the patients with any indicator of severe malaria

caused by *P. vivax*, such as primary infection, longer symptom duration, and the presence of clinical signs and laboratory indicators of severe malaria. Larger platelets are metabolically and enzymatically more active and have a more important role in the inflammatory process<sup>16</sup>. Elevated PDW has also been described in patients with severe sepsis and is explained by the quick splenic and medullary release of large volumes of platelets in response to the increased demand for these cells<sup>17</sup>. In fact, studies in humans and rats showed that large platelets are functionally more active and have a lower threshold for aggregation and the release of their activity<sup>9,16</sup>. It is well known that PDW is linearly correlated with MPV in normal individuals. So raised PDW use as a prognostic tool for *p.vivex* of acute illness.

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