



Raised MPV and Thrombocytopenia Common Hematological Parameters as a Prognostic & Diagnostic Tool of Plasmodium Vivex Malaria for Acute Illness

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Abstract

Aims & Objectives - 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 MPV 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 most common complications of the P. vivax malaria and as a prognostic indicator of acute illness of malaria. Thrombocytopenia with raised Mean platelets volume hematological parameter is a adequate prognostic & diagnostic tool for acute illness and parasitemic index

Keyword- Mean platelets volume Thrombocytopenia Platelets aggregation.

MATERIAL & METHODS

Study area and design- The present study was conducted at the Department of medicine and pathology MGM Medical College ,M.Y. Hospital and associated hospitals indore M.P. The study was designed as a observational hospital based study over a period of time from 2013 to 2015 years.

Ethical consideration- Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol then generate the report of each patient. Take informed consent was obtained from all study participant. 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 malaria positive. We include both OPD and IPD patients with all age groups, male and female both gender for study. Sample size is 75 patients.

COMPLETE BLOOD COUNT (CBC) AND PERIPHERAL SMEAR

Materials:

1. Purple vacutainer tube or capillary collector (EDTA) ethylenediaminetetraacetate
2. Slides and blue capillary tube
3. Needle or lancet
4. Vacutainer holder
5. Alcohol swab
6. Cotton balls
7. Absorbent materials
8. Slide case

Procedure:

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

Preparation of peripheral blood smear from prolong stored (> 6hr) sterile EDTA containing blood sample tube at room temperature.

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 45⁰ 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..

A well-made peripheral smear is thick at the frosted end and becomes progressively thinner toward the opposite end. The “zone of morphology” (area of optimal thickness for light microscopic examination) should be at least 2 cm in length. The smear should occupy the central area of the slide and be margin-free at the edges.

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	Type of severity	Total Cases (n=75)	
		No.	%
Thrombocytopenia	Acute illness	48	64.00%
Non Thrombocytopenia	Non acute illness	27	36.00 %

Plasmodium Vivex	Type of severity	Total Cases (n=75)	
		No.	%
MPV within normal limit	Non acute illness	29	38.66 %
Raised MPV	Acute illness	46	61.33 %

Plasmodium Falciparum	Type of severity	Total Cases (n=50)	
		No.	%
Thrombocytopenia	Non Acute illness	11	22.00%
Non Thrombocytopenia	Acute illness (Cerebral)	39	78.00%

Plasmodium Falciparum	Type of severity	Total Cases (n=50)	
		No.	%
MPV with normal limit	acute illness	37	74.00 %
Raised MPV	Non acute illness	13	26.00 %

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 mono infection presented with thrombocytopenia and raised MPV suggesting that acute illness (Alexandre et al. 2010) (Santana Filho et al. 2007, Tjitra et al. 2008) (Patel et al. 2004). *P. vivax* malaria has now clearly emerged as a potentially lethal condition^[1,2], despite of having previously been considered a benign disease. *P. vivax* is more widely distributed than *P. falciparum* and has potential to cause morbidity and mortality.^{[3],[4]}, Kochar and colleagues have recently shown that severe thrombocytopenia (platelet count $<20 \times 10^3/\text{mm}^3$) is a common manifestation in patients with vivax mono-infection confirmed by PCR^{[5],[6]}.

thrombocytopenia in malaria seems to be a multifactorial phenomenon and probably involves an increase in platelets destruction and consumption^{[7],[8]-[10]}.

P. vivax revealed a high frequency of thrombocytopenia and raised MPV 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 by Franklin *et al.*^[11] and Coelho *et al.*^[12] regarding patients infected with *P. vivax* in the Amazon region. Increased MPV in malaria has been observed in other studies maskar as acute illness.^[13,14].

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^[15]. Raised MPV predominated in the patients with any indicator of severe malaria caused by *P. vivax*, such as primo 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^[16]. Elevated MPV 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^[17]. 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^[9,16]. It is well known that PDW is linearly correlated with MPV in normal individuals.

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