



Pathological changes associated with Malaria: Haematological Perspective

Obeagu Emmanuel Ifeanyi^{1,2} and Obeagu Getrude Uzoma³

¹Medical Laboratory Science, University Health Services, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria

²Department of Medical Laboratory Science, Imo State University, Owerri, Nigeria

³Department of Nursing Science, Ebonyi State University, Abakaliki, Nigeria

E-mail: emmanuelobeagu@yahoo.com

Abstract

Malaria is a public health threat to the existence of human beings especially in the tropical countries of the developing countries. It has been causing a lot of morbidity and mortality in the society. It presents with a lot of changes in the body of the patients especially in the blood pictures. This paper was written to enlighten the world on the pathological changes in relation to haematology.

Keywords: pathological changes, malaria, haematological perspective

Erythrocytes and Leucocytes

Malaria parasitaemia is one of the leading causes of child mortality and morbidity worldwide, the most frequently encountered in Nigeria and other parts of the world which kills not less than 1 million children in Africa alone annually (Obeagu *et al.*, 2017; Obeagu *et al.*, 2019). Certainly, malaria gives ample evidence for increased destruction and reduced production of red cells. Erythrocytes are destroyed as the parasite complete their growth cycle although some parasite may be removed from erythrocytes as immature ring forms by phagocytic cells (Angus *et al.*, 1997). Since infection results in red cells destruction, a severe attack produced the blood picture of haemolytic anaemia. *Plasmodium falciparum* infected red cells become sticky and adhere to the capillary and venule wall in internal organs. The flow of normal red cells is impaired, haemostasis occurs, and thrombi develop.

Changes in leucocytes and platelet count are present in malaria. In addition, there are significant affects on leucocytes function. Leucocytosis, although leucopaenia may also occur. Occasionally, leukaemoid reactions have been observed. Leucocytosis has been associated with severe disease (Newton *et al.*, 1998). Monocytosis can be found in population and eosinophilia occurs occasionally following chemotherapy.

Platelets and Blood Coagulation

Thrombocytopenia is almost invariable in malaria and so may be helpful as a sensitive but non specific marker of active infection. However,, severe thrombocytopenia is rare. It has been suggested that thrombocytopenia may result from disseminated intravascular haemolysis and was associated with haemoglobinuria has been a rare complication of

malaria resulting from a drug dependent occurring secondary to haemolytic anaemia generated to mechanisms (Zuckermann, 1996).

Anaemia

It has been estimated that severe malaria causes between 1900,000 and 974,000 deaths each year among children < 5 years (Murphy *et al.*, 2001). In non-immune individuals and those exposed to malaria for the first time, significant anaemia with packed cell volume levels less than 35% have been reported (Confield, 1969). In endemic areas, a number of additional factors, including the immune status of the infected individuals, the presence of haemoglobinopathies or red cell enzymatic defects intercurrent infections and nutritional factors, influence the degree of anaemia occurring during malaria infection. Folic acid deficiency is frequently found in patients suffering from malaria and this lack has been suggested as a contributing factor to bone marrow depression (Stickland *et al.*, 1970). Uptake of vitamin B12 has also been shown to reduce inpatients suffering from acute malaria. Folic acid and vitamin B12 deficiency may therefore contribute to bone marrow hypoplasia and megaloblastic changes occasionally associated with malaria (Luc *et al.*, 1982).

Anaemia may become worse after treatment begins, particularly if the parasitaemia is high. Anaemia is typically normocytic and normochromic, with a notable absence of reticulocytes, although microcytosis and hypochromia may be present due to the very high frequency of alpha and beta thalassaemia traits and/ or iron deficiency in many endemic areas (Newton *et al.*, 1998).

Conclusion

Malaria presents with a lot of alterations in the haematological parameters of the patients in relation to healthy individuals in the society especially where malaria is endemic. Malaria affects erythrocytes, thrombocytes and leucocytes resulting to the signs and symptoms seen in malaria. Anaemia is typically normocytic and normochromic, with a notable absence of reticulocytes, although microcytosis and hypochromia may be present due to the very high frequency of alpha and beta thalassaemia traits and/ or iron deficiency in many endemic areas.

References

- Angus, B.J., Chotivanich, K., Udomsangpetch, R., White, N.J. (1997). In Vivo removal of malaria parasites from red blood cells without their destruction in acute falciparum malaria. *Blood* **90**: 20-37.
- Canfield, C.J. (1969). Renal and haemolytic complication of acute falciparum malaria in Vietnam. *Bull. NY.Acad. Med.* **45**: 10-43.
- Dennis, L.H. and Eicherberger, J.W. (1967). Depletion of coagulation factors in drug resistance falciparum malaria. *Blood* **29**: 7-13.
- Luc, H.P., Lindsay, J.M. and Misscher, P.A. (1982). The Haematology of malaria in Man. *Seminars in Haematology* **19**(2): 70-82.
- Newton, C.R. and Warell, D.A. (1998). Neurological Manifestations of falciparum malaria. *Ann. Neuro* **43**: 695.
- Stickland, G.T. and Koshima, J.E. (1970). Folic acid deficiency complicating malaria. *Am. J. Trop. Med. Hyg.* **19**: 910.
- Zuckermann, A. (1996). Recent studies on factors involved in malaria anaemia. *Milrit. Med.* **131**: 1201.
- Obeagu, E.I., Ochei, K.C. and Mbah P.C. (2019). Haemolysis associated with malaria infection: A threat to human existence. *World Journal of Pharmaceutical and Medical Research* **5** (6): 47-49.
- Obeagu, E.I., Didia, B.C., Obeagu, G.U. and Azuonwu, O (2017). Evaluation of changes in haematological profile of cerebral malaria patients in Enugu State, Southeast, Nigeria. *Ann. Clin. Lab. Res.* **5** (4): 202.

Access this Article in Online	
	Website: www.ijarbs.com
	Subject: Haematology
Quick Response Code	
DOI: 10.22192/ijarbs.2019.06.09.010	

How to cite this article:

Obeagu Emmanuel Ifeanyi and Obeagu Getrude Uzoma. (2019). Pathological changes associated with Malaria: Haematological Perspective. *Int. J. Adv. Res. Biol. Sci.* 6(9): 81-82.
DOI: <http://dx.doi.org/10.22192/ijarbs.2019.06.09.010>