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KESINEE THANIKKUL: STUDIES ON THE PATHOGENESIS OF ERYTHROCYTE DYSFUNCTION IN MALARIA. THESIS ADVISOR: RACHANEE UDOMSANGPETCH, Ph.D., TONGTAVUCH ANUKARAHANON TA, MD., Ph.D., WITAYA THAMAVIT, D.V.M., M.S., PEERAPAN TAN-ARIYA, Ph.D. 86 p. ISBN 974-589-314-5

Deformability of red cells plays a major role in the maintenance of physiological function of all tissues and organs. During malaria infection the deformability of *P. falciparum*-infected red cells was reduced significantly corresponding to the parasite maturation. The deformability of uninfected red cells was also decreased significantly after exposure to parasite-released products. At high shear, both quinine and artesunate inhibited reduction of deformability of the ring/ trophozoites-infected red cell ($p=0.05$). However, artesunate showed a greater effect than quinine ($p=0.005$). Antigenic alteration on the surface of infected red cells was investigated. There was no significant increase in antimalarial antibodies binding to the infected red cell after artesunate exposure. In blood obtained from patients with falciparum malaria, ring-infected erythrocyte surface antigen (RESA) was observed on the membrane of the red cells without intracellular parasites (RESA-RBC). In patients with uncomplicated malaria, the number of RESA-RBC increased significantly ($p=0.002$) 24 hours after treating with qinghaosu derivatives. With quinine, significant increase ($p=0.002$) was observed within 7 days. In severe malaria, the number of RESA-RBC was significantly increased ($p=0.001$) at 8 hours after treating with qinghaosu derivatives but not with quinine ($p=0.43$). Although parasitaemia was negative, RESA-RBC was still observed in the blood up to day 21. There was no RESA-RBC in the parasite culture with or without the addition of the qinghaosu derivatives.

In conclusion, the rapid parasite clearance by qinghaosu derivatives does not result from either the changes of red cell deformability or increased antibody binding to the infected red cells. The innate mechanism of the spleen in removal of parasites without red cell destruction may have an important role for parasite clearance and qinghaosu derivatives can enhance this process. This can explain why the fall in hematocrit is less than predicted in relation to the loss of parasites in hyperparasitaemic patients.