Subdural hematoma in Plasmodium vivax malaria: Another Nail hammered on the coffin

Sir,

The letter by Gosh *et al*.[1] once again emphasizes that *Plasmodium vivax* infection is not always a simple and self-limiting infection. In comparison with *Plasmodium falciparum*, *P. vivax* runs a benign course and is rarely fatal. However, in recent times, scenarios have changed and there are reports of severe malaria due to *P. vivax*

infection.[2] In this context, we would like to suggest the probable mechanisms based on our earlier observations[3] and measures to tackle such situations.

Though the exact mechanism of subdural hemorrhage in this patient is not known, there is a possibility of rupture of small vessels plugged by infected red cells in combination with severe thrombocytopenia.[4] This hypothesis has been supported by histopathological studies disclosing widespread cerebral vasculopathy due to parasite-specific factors such as adhesion and sequestration of parasitized erythrocytes in vascular endothelium with increased endothelial permeability, perivascular infiltrations, and cerebral edema; capillaries and venules are also distended and packed with erythrocytes.[5]

In *P. vivax* infections, parasitemia seldom exceeds 2-5% of circulating RBCs, and high parasite indices are not attributed to the severity of the disease. However, cytokine production during *P. vivax* infections is higher than that during *P. falciparum* infections with similar degree of parasitemia.[6] By up-regulating endothelial adhesion molecules, TNF-α may promote cerebral sequestration of platelets and red cells thus leading to hemorrhage. The serum TNF-α level correlates well with the severity of disease. In addition, patient-specific factors such as oxidative stress, enhanced host inflammatory responses, and alterations in splenic functions might have played a pivotal role. Thus, patient susceptibility to develop vascular complications may be attributable to gene polymorphism.

This is common for all clinical conditions and not specific for plasmodium vivax complications.

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Website: www.ijccm.org

DOI: 10.4103/0972-5229.140157