Commentary

Neurological features of malaria are well known and cerebral malaria is a neurological illness. Cerebral malaria is considered synonymous to *falciparum* malaria. This association of cerebral malaria to *falciparum* infection only has been questioned for a very long time. Though speculative in the initial days, there is sufficient evidence now that *vivax* malaria as well can cause cerebral malaria. *Vivax* malaria, therefore should not be equated to benign and uncomplicated malaria as was thought before. In recent years a lot of cases have been reported which refute this picture of benignity.[1,2] Convulsions are common, especially in children. Seizures are usually generalized and tonic clonic but electroencephalogram identifies a focal origin in many patients. Malarial encephalopathy is a known complication. It is usually symmetric with localizing signs being noted infrequently. Other neurological signs include altered sensorium, neck stiffness with divergent gaze, sixth nerve palsy, absent abdominal reflexes, extensor planters with variable tone, and loss or exaggeration of deep tendon reflexes. These signs are not specific to *vivax* or *falciparum* infection and can be present in both. The infection may be a standalone or a mixed one at times. A variety of neuro-ophthalmological signs may be noted. Dysconjugate gaze is a common finding. Corneal and conjunctival reflexes are usually intact with symmetric pupils reacting normally to light. Papilledema, although rare, is a poor prognostic sign. Retinal hemorrhages and unusual. The prognosis of cerebral malaria worsens considerably with coexistent renal failure, severe jaundice,

or metabolic acidosis which can occur in both the types of malaria. Subarachnoid hemorrhages have been described in patients with cerebral malaria. They usually occur due to the rupture of small vessels which get plugged by red cells in combination with severe thrombocytopenia and associated disseminated intravascular coagulation. Other reported atypical neurological manifestations associated with cerebral malaria include central pontine myelinosis (CPM) and spontaneous subdural empyema. Cerebral malaria due to *Plasmodium vivax* infection is a known entity now.[3,4] The view that *Plasmodium vivax* malaria may not be the paradigm for benign malaria was argued by Picot in 2007.[5] He argued that when a patient with *vivax* malaria exhibits signs of severity, the issue is to find *falciparum* but it may be possible that *vivax* itself may be involved with a possibly different pathogenesis. Cytoadherence phenomena are believed to be central to the etiology in *falciparum* malaria, but their role in *P. vivax* malaria remains unclear. Potential factors suggested are the presence of concurrent infections, mixed plasmodium infections, reversible local changes in the microvasculature, endothelial activation, and injury and microvascular thrombo-inflammatory responses.[6] The same year JC Baird has argued that *vivax* infection must not be neglected as it can become lethal in a similar way to *falciparum* infection.[7] Rare neurological menifestations like Acute disseminated encephalomyelitis and cerebellar malaria has been described in *vivax* malaria.[8] In India, acute intermittent porphyria was an unexpected co-morbidity associated to the neurological manifestations of patients with *vivax* malaria. Other non-neurological manifestations have also been described which may add up to the complexity of the picture. Thrombocytopenia is very common. Nephrotic syndrome, acute glomerulonephritis and hemolytic uraemic syndrome have all been described in *vivax* malaria and they add up to the commulative morbidity and mortality.

It is thus evidence based that *vivax* malaria is not a benign condition and varied and rare manifestations have been described. Researchers are arguing for the last 30 years about the possible complications which are protean and can be quite baffling. *Vivax* malaria may be neglected as benign and this attitude may indeed be dangerous. While it has long been considered to be clinically uncomplicated, three recent large prospective epidemiological studies from Indonesia, Papua New Guinea and India have challenged this perception, associating *P. vivax* infections with severe manifestations of disease including anemia, respiratory distress, coma and death.[9-11]

Spontaneous and occult bleeding like extradural haematoma can develop and needs a high index of suspicion in such cases.[12]

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References

1. Sarkar S, Bhattacharya P. Cerebral malaria caused by Plasmodium vivax in adult subjects. Indian J Crit Care Med 2008;12:204-5.
2. Ozen M, Gungor S, Atambay M, Daldal N. Cerebral malaria owing to Plasmodium vivax: Case report. Ann Trop Paediatr 2006;26:141-4.
3. Sachdev HS, Mohan M. Vivax cerebral malaria. J Trop Pediatr 1985;31:213-5.
4. Beg MA, Khan R, Baig SM, Gulzar Z, Hussain R, Smego RA Jr. Cerebral involvement in benign tertian malaria. Am J Trop Med Hyg 2002;67:230-2.
5. Picot S. Is Plasmodium vivax still a paradigm for uncomplicated malaria? Med Mal Infect 2006;36:406-13.
6. Anstey NM, Russell B, Yeo TW, Price RN. The pathophysiology of vivax malaria. Trends Parasitol 2009;25:220-7.
7. Baird JK. Neglect of Plasmodium vivax malaria. Trends Parasitol 2007;23:533-9.
8. Taksande B, Jajoo U, Jajoo M. Cerebellar Malaria: A rare manifestation of plasmodium *vivax*. The Internet J Neurol 2007;7:10.
9. Genton B, D'Acremont V, Rare L, Baea K, Reeder JC, Alpers MP, *et al*. Plasmodium vivax and mixed infections are associated with severe malaria in children: A prospective cohort study from Papua New Guinea. PLoS Med 2008;5:e127.
10. Tjitra E, Anstey NM, Sugiarto P, Wariker N, Kenangalem E, Karyana M, *et al*. Multidrug-resistant Plasmodium vivax associated with severe and fatal malaria: A prospective study in Papua, Indonesia. PLoS Med 2008;5:e128.
11. Kochar DK, Das A, Kochar SK, Saxena V, Sirohi P, Garg S, *et al*. Severe Plasmodium vivax malaria: A report on serial cases from Bikaner in northwestern India. Am J Trop Med Hyg 2009;80:194-8.
12. Senthilkumaran S, Balamurugan V, Suresh P, Thirumalaikolundusubramanian P. Extradural hematoma in *Plasmodium vivax* malaria: Are we alert to detect? J Neurosci Rural Pract 2013;4 (Suppl 1):s145-6.

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