

## Spontaneous acute subdural hematoma in malaria : a case report

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Malaria is a major health problem in tropical countries. Among its complications, cerebral malaria is the most devastating and can present as hemiplegia, convulsions, disorientation, delirium, coma and finally death<sup>1,2</sup>. Rare complications of cerebral malaria such as spontaneous subdural empyema and subarachnoid hemorrhage has also been reported in literature<sup>1,3,4</sup>. We report development of spontaneous acute subdural hematoma in a patient of *Plasmodium falciparum* malaria.

### Case report

A 70-yr male presented in our emergency department in altered sensorium. The patient was being treated at a private set up for *P. falciparum* malaria from past 10 days. The patient developed right-sided weakness and became disoriented on the ninth day and for which a non contrast computed tomography scan of the head was done that revealed massive acute left-sided subdural hematoma with mass effect and midline shift. There was subfalcine and transtentorial herniation (Fig. 1). The patient was hence referred to our centre for expert management. There was no history of head trauma or fall from height.

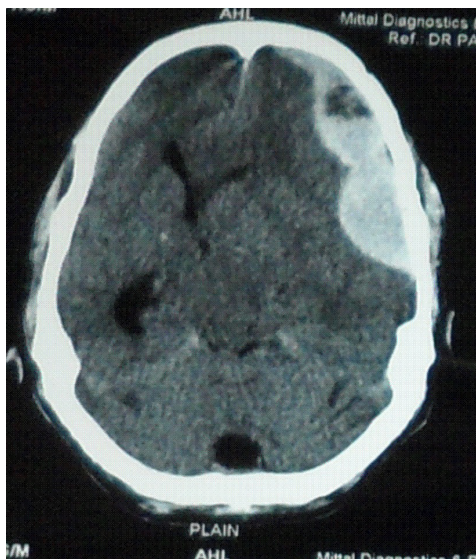


Fig. 1: Non-contrast computed tomographic scan of head showing left-side acute subdural hematoma with mass effect and midline shift. There is subfalcine and transtentorial herniation.

At the time of admission patient was febrile (102° F) and Glasgow coma scale (GCS) was 6. Pupils were unequal and not reacting to light. Respiratory examination was within normal limits. Laboratory investigations revealed hemoglobin of 4 g/dl. Peripheral blood examination revealed *P. falciparum*, thrombocytopenia (platelet count 42000/cc) and hypochromic anemia. Renal function, electrolytes, coagulation profile was also within normal limits.

A left-sided frontotemporal osteoplastic flap craniotomy was performed. On opening, the dura thick clot was removed completely. A small cortical vessel was found bleeding actively which was coagulated. Dura was closed without any difficulty and the bone flap was replaced while closure of the wound. Post-operatively the patient was kept on antibiotics, antimalarials and antiepileptics. Since the patient had presented with severe malaria and was previously being treated at a private clinic for several days, it was presumed that malaria may be multidrug resistant. So, the patient was treated with intravenous artesunate as per standard protocol.

Post-operative scan revealed complete removal of the clot and re-expansion of the brain. GCS started improving from second post-operative day. By fourth day the patient started localizing the painful stimulus, had spontaneous eye opening and spoke inappropriate words and became afebrile. The patient was recovering satisfactorily but unfortunately he developed severe chest infection to which he succumbed.

Malaria is a major health problem in developing countries and out of the four species, *P. falciparum* is the most dangerous. Majority of deaths are caused by *P. falciparum*<sup>2</sup>. Severe falciparum malaria is characterized by hypoglycemia, lactic acidosis, non-cardiogenic pulmonary edema, renal impairment and cerebral complications<sup>5</sup>.

Cerebral malaria is the most dreaded complication and despite treatment, is associated with death rates of ~20% among adults and 15% among children<sup>2</sup>. Cerebral malaria presents as diffuse symmetric cerebral encephalopathy with focal signs being exceedingly rare<sup>2</sup>. Coma is the hallmark of cerebral malaria. Convulsions are more com-

mon in children as compared to the adults<sup>6</sup>. CSF pressure is raised, probably due to increased cerebral blood flow. Unusual complications, such as subdural empyema and subarachnoid hemorrhage are exceedingly rare. Only two cases of each has been reported so far<sup>1,3,4</sup>. In the case reported by Dwarkanath *et al*<sup>4</sup> subdural empyema was associated with subdural hematoma which was evacuated surgically. Smythe & Cairns<sup>3</sup> reported a case of subdural abscess complicated falciparum malaria which was treated with repeated aspirations, antimalarials and antibiotics. This is the first case report of spontaneous acute subdural hematoma in a patient of falciparum malaria presenting as neurosurgical emergency. Subdural hemorrhage in our patient may have been caused by the rupture of a small vessel plugged by red cells in combination with severe thrombocytopenia. The likely mechanism in formation of hematoma may be due to an increase in serum TNF- $\alpha$ , whose concentrations correlate well with the severity of disease<sup>6</sup>. By up-regulating endothelial adhesion molecules, TNF- $\alpha$  may promote cerebral sequestration of platelets and red cells thus leading to hemorrhage<sup>7</sup>.

### CONCLUSION

It is thus concluded that apart from diffuse cerebral

encephalopathy, cerebral malaria can also present as spontaneous subdural hemorrhage. If the patients of cerebral malaria develop focal neurologic deficit this complication, though rare, should be considered and prompt imaging should be done to treat this life threatening emergency.

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