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Clinical Image

CLINICAL IMAGE

Cerebral malaria with extensive subcortical microhemorrhages

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A 48-year-old man with an altered mental status presented for evaluation after returning from vacation to malaria-endemic region (Kruger area) of South Africa; he did not take prophylaxis prior to his travel. Five days prior to presentation, he experienced symptoms including headache and myalgias. His blood smear showed 23.6% parasite burden of *Plasmodium falciparum*. He rapidly deteriorated and developed encephalopathy, then became deeply comatose for several days in the context of malaria-related multiorgan failure.

Computed tomography scans of the brain demonstrated no significant abnormality. The next day, magnetic resonance imaging (MR) brain revealed innumerable foci of microhemorrhages, primarily in the subcortical and basal ganglia distribution on susceptibility-weighted imaging (SWI) images (Fig. 1a). There were no macroscopic intraparenchymal hemorrhages, restricted diffusion or abnormal enhancement. One week later, a follow-up MR demonstrated stable microhemorrhages and new subcortical FLAIR signal hyperintensity (Fig. 1b). Subsequent MR performed at 3 weeks showed stable microhemorrhages and interval resolution of the fluid attenuated inversion recovery (FLAIR) signal abnormality.

Ultimately, the patient recovered with deconditioning but no apparent neurological sequelae. Approximately 1 year after discharge, he made a return visit to Africa and opted for malaria prophylaxis.

Falciparum malaria is a leading cause of illness and death in tropical countries [1]. Severe malaria occurs mostly in patients without background immunity, manifesting predominantly in children in endemic areas. Although, it can occur in adults who are first exposed to malaria later in life [2]. The mortality of adult cerebral malaria is ~20% with death rates up to 50% when accompanied by organ failure [3]. In fatal cases, postmortem analysis demonstrates petechial hemorrhages in cut sections due to microangiopathy with cerebral capillaries and venules packed with parasitized red blood cells [3]. MR susceptibility-weighted imaging (SWI) may demonstrate these microangiopathy-related cerebral hemorrhages prior to any

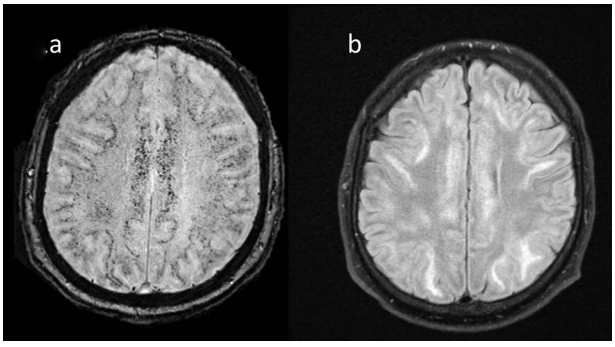

Figure 1: MR SWI demonstrated innumerable foci of hypointensity representing microangiopathy-related microhemorrahages, primarily near the gray/white interface (**a**). Follow-up MR performed ~1 week after initiation if anti-malarial therapy demonstrated no significant change in cerebral microhemorrhages on SWI images (not shown), with new subcortical signal hyperintensity representing edema on FLAIR images (**b**).

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other imaging modality or MR sequence thereby, strongly supporting the diagnosis of cerebral malaria in the proper clinical context [4].

CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests.

FUNDING

Not applicable.

ETHICAL APPROVAL

Institutional Review Board approval was not required.

CONSENT

Informed consent was obtained from the patient for the use of medical records and clinical images for research and publication.

GUARANTOR

Derek R Johnson.

ABBREVIATIONS

CT, computed tomography; FLAIR, fluid-attenuated inversion recovery; MR, magnetic resonance imaging; SWI, susceptibility-weighted images

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