Reviewer's report

Title: Heat Stroke Presenting with Encephalopathy and MRI Findings of Diffuse Cerebral Injury and Hemorrhage

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Reviewer: Satoshi Yamashita

Reviewer's report:

The authors described a patient with heat stroke presenting with encephalopathy and bilateral cerebral, cerebellar, and thalamic lesions and intraventricular hemorrhage on MRI. They assumed that the MRI findings were likely multifactorial and attributable to direct heat toxicity, ischemic vasculopathy, blood-CSF breakdown with vasogenic edema, and/or cytotoxic edema. In addition, these changes could be related as a consequence of a heightened inflammatory acute-phase response as shown by elevated serum markers of ESR and CRP.

Major Compulsory Revisions:
I have some critical concerns as follows.
1) There is no direct evidence showing that the patients had heatstroke, such as core body temperature of greater than 40°C (104°F).
2) Although it is unclear whether the patient had undergone an intensive treatment in an outside hospital, it is doubtful that the patient had multiorgan failure because the laboratory data upon transfer showed almost normal findings except an elevated C-reactive protein, ESR, and transaminase, and a macrocytic anemia.
3) Was there an elevation of serum CK levels? How about CSF analysis? The patient should be excluded the possibilities of hypercoagulation resulting in brain infarction, neuroleptic malignant syndrome, or meningitis/encephalitis because the patient have a past medical history of hyperhomocysteinemia and major depressive disorder.
4) It is likely that the patient was in a hypercoagulation state because of hemoconcentration, dehydration, and/or hyperhomocysteinemia, and then he had cardiogenic embolism especially in the posterior circulation of the brain. Did the patient have risk factors for stroke such as paroxysmal atrial fibrillation? Transthoracic echocardiogram would not be enough to detect intracardiac emboli. The intraventricular hemorrhage on MRI might be due to a hemorrhagic infarction?
5) If abnormal MRI lesions were attributed to direct heat toxicity, ischemic vasculopathy, blood-CSF breakdown with vasogenic edema, and/or cytotoxic edema, the lesions in follow-up MRI should be disappeared or changed even in a short period. Was the follow-up MRI performed? In addition, we assume that the
lesions should be symmetric and diffuse in the vulnerable regions if the lesions were attributable to direct heat toxicity.

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Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests.