Bright Hippocampi: Diffusion MR Imaging of Hypoglycemic Encephalopathy

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A 52-year-old diabetic female presented to emergency department in unconscious state, noticed by family members when she did not awaken in the morning. She had inadequate food intake for previous 3 days but continuing oral hypoglycemic agents without self monitoring of blood glucose. Her vital signs on arrival to hospital were normal. The patient was comatose, localizing to painful stimuli, pupils were normal size and normal reaction to light. Blood glucose level was very low 26 mg/dl. Other routine biochemical, hematological tests and electrocardiogram were normal. Her altered mental status did not improve after giving 25% intravenous dextrose solution. Brain magnetic resonance imaging (MRI) revealed hyperintense signals selectively involving bilateral hippocampi in FLAIR sequence (Figure 1a). Diffusion-weighted MRI showed bright hippocampi with diffusion restriction (Figure 1 b, c and d). Hypoglycemic encephalopathy was diagnosed due to unnoticed prolonged hypoglycemia. Permanent brain dysfunction occurred in our patient and she remained in persistent vegetative state.

Varied neurologic manifestations of hypoglycemia ranging from altered mental status, seizures, and focal neurologic deficits to permanent brain dysfunction or death can occur. According to previous reports, the brain lesions show vulnerability to cerebral cortex, hippocampus, splenium of corpus callosum and cerebral white matter in diffusion-weighted MRI. Thalami and cerebellum are usually spared. Energy failure, cytotoxic edema, and asymmetric cerebral blood flow are proposed mechanism for diffusion restriction in hypoglycemic encephalopathy. The prognosis or neurologic consequences of hypoglycemic encephalopathy depends on the severity as well as duration of hypoglycemia. Diffusion restriction in the cerebral cortex, basal ganglia or hippocampus and the non-regression of the lesions on second imaging are also reported as predictor of poor outcome.

References

Fig. 1: Brain MRI shows hyperintense signals selectively involving bilateral hippocampi in FLAIR sequence (a). Diffusion-weighted MRI reveals bright hippocampi with diffusion restriction (b, c and d).

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Received: 23.05.2017; Accepted: 25.08.2018