Differential Diagnosis of Restricted Diffusion of the Thalamus—Focus on Viral Encephalitis

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Keywords

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Case History

A 41-year-old man was transferred to our hospital in October with a 3-day history of headaches, confusion, and fever, which rapidly progressed to coma after admission. Cerebrospinal fluid studies showed neutrophilic pleocytosis at 138/ μ L. Herpes simplex virus polymerase chain reaction (PCR) and West Nile virus serology were negative, as were influenza virus PCR and HIV serology from blood.

Magnetic resonance imaging (MRI) of the brain (Figure 1) showed bilateral-restricted diffusion in the deep gray matter and cortex, predominantly involving the thalami and occipital cortices. The patient died 5 days after admission. On postmortem examination, immunohistochemistry and PCR performed at State of Connecticut and CDC laboratories was positive for Eastern Equine Encephalitis (EEE).

Discussion

Familiarity with particular patterns of restricted diffusion on brain MRI can suggest the diagnosis in a variety of neurologic conditions.¹ In our case, the diagnosis of EEE was only determined postmortem. In the clinical setting of encephalitis, thalamic-restricted diffusion can facilitate the diagnosis including specific viral etiologies.

Arboviruses have a predilection for involvement of thalamus and basal ganglia.² Taking into account adult age, geography of the Northeastern United States, and time of year in this case, the MRI finding of thalamic-restricted diffusion limits the differential for viral encephalitides to influenza,³ West Nile,⁴ Epstein-Barr virus,⁴ and EEE.

Our case emphasizes that restricted diffusion of the thalamus with or without cortical involvement (Figure 2) can help diagnostically, particularly in the setting of viral encephalitis.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Figure 1. Axial magnetic resonance imaging (MRI) of the brain. Axial MRI of the brain with diffusion weighted (A and C) and apparent diffusion coefficient (B and D) showing bilateral thalamic restricted diffusion.

Figure 2. Restricted diffusion of deep gray with and without cortical involvement.

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