

Transient Brain Hyperperfusion Detected With I-123 IMP SPECT in a Patient With Neuropsychiatric Systemic Lupus Erythematosus

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Abstract: We report the case of a 25-year-old woman with systemic lupus erythematosus. She complained of headache and left hemiparesis and was admitted to our hospital. She was in a coma after admission. Brain MRI showed no abnormalities, but brain single photon emission computed tomography showed diffuse hyperperfusion in the right frontal and temporal lobes. The calculated measured regional cerebral blood flow in the right hemisphere was increased to 40 to 55 mL/100 g/min, and that in the left was within the normal range of 25 to 35 mL/100 g/min. Two months later, the hyperperfusion was disappeared. The hyperperfusion could be explained by inflammatory changes.

Key Words: systemic lupus erythematosus, cerebral blood flow, I-123 IMP, hyperperfusion

(*Clin Nucl Med* 2009;34: 601–603)

Received for publication December 8, 2008; accepted April 5, 2009.
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ISSN: 0363-9762/09/3409-0601

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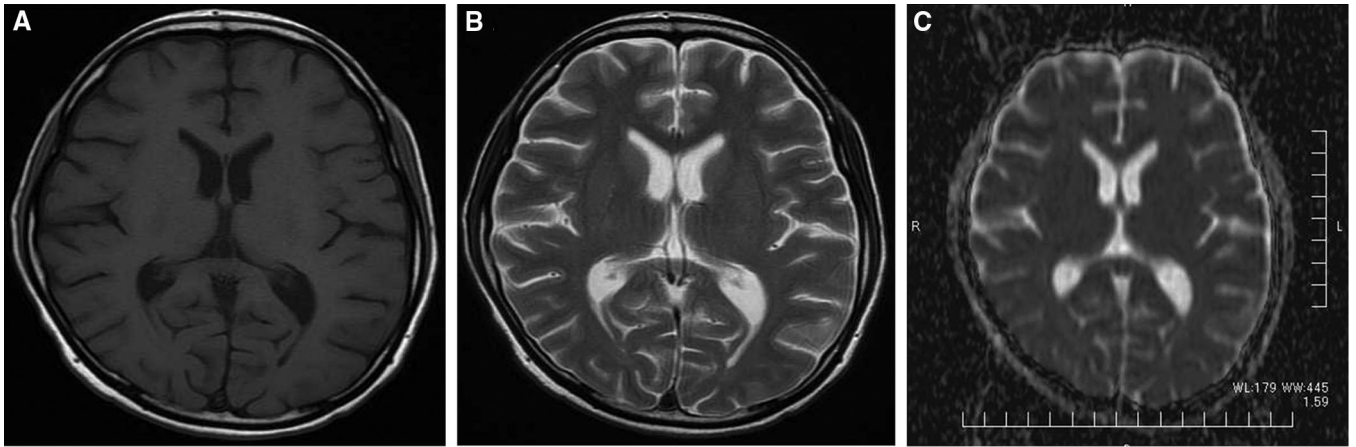


FIGURE 1. A 25-year-old woman with systemic lupus erythematosus complained of headache and left hemiparesis and was admitted to our hospital. She was in a coma after admission. Brain MRI was performed and T1-weighted image (A), T2-weighted image (B) and diffusion-weighted image (C), which were obtained with a clinical 1.5-T MR imaging unit. These images show no certain abnormality. Unfortunately, MRI is not so sensitive to detect abnormalities in central nervous system (CNS) lupus.¹

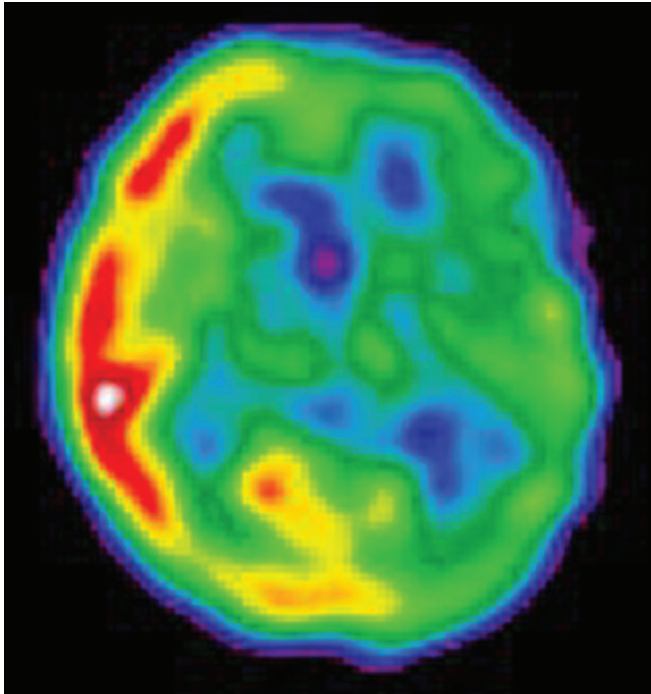


FIGURE 2. This is the I-123 IMP brain single photon emission computed tomography (SPECT) study when she admitted to our hospital. The acquisition was performed as described in previous reports.² The SPECT scan showed diffuse hyperperfusion in the right frontal and temporal lobes, the calculated regional cerebral blood flow (rCBF) in the right hemisphere was increased to 40 to 55 mL/100 g/min, and the rCBF in the left hemisphere was within the normal range of 25 to 35 mL/100 g/min. According to Hatazawa et al, the mean rCBF of normal subjects is 33.0 mL/100 g/min.³ Many authors have reported that there is reduced rCBF in patients with CNS lupus.^{4,5} There are no reports of hyperperfusion in the brain of the CNS lupus patients. An infection in CNS was less likely because no significant increase of the cerebrospinal fluid cell count was observed. No certain findings of crossed cerebellar diaschisis were observed, and her left hemiparesis could be explained by abnormalities not in the left brain hemisphere but in the right.

The SPECT scans showed blood flow abnormalities, but normal findings were observed on the MRI scans. These findings may depend on the difference in sensitivity of SPECT and MRI for detecting CNS lupus abnormalities. Some authors have reported that SPECT is more sensitive in CNS lupus than MRI,⁴ and the sensitivity of SPECT for clinical CNS lupus is 90%.⁶ The higher sensitivity of SPECT may be explained by considering that alterations of rCBF may occur before structural damage become manifest.

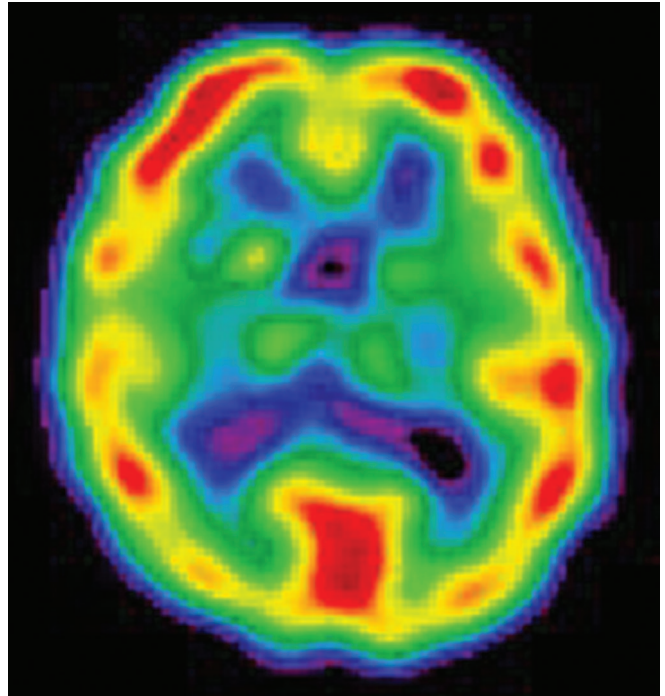


FIGURE 3. This I-123 IMP brain SPECT, which was performed 2 months after her recovery, shows no certain abnormality. The laterality has disappeared. The transient hyperperfusion in the brain that was observed in this case could be explained by vasculitis such as herpes encephalitis.⁷ Vasculopathy has been observed at autopsies of adult patients with systemic lupus erythematosus.⁸

Inflammatory changes might transiently increase rCBF and this phenomenon could be rapidly diminished in CNS lupus. Thus, it has not been noted in previous studies. When the inflammatory changes in the brain are severe enough to show hyperperfusion on SPECT, the patients may be in a critical condition. It may be difficult to obtain emergent SPECT images in this acute phase, and this might be a reason why hyperperfusion has not yet been reported in patients with CNS lupus.