PICTORIAL MEDICINE

A reversible cause of blindness that should not be forgotten: cyclosporine-induced posterior reversible encephalopathy syndrome

Clinical information

In November 2006, a 35-year-old Chinese woman known to have systemic lupus erythematosus (SLE) treated with cyclosporine, was admitted to hospital with proximal muscle weakness and diagnosed with polymyositis. Systemic steroid treatment was then started. She developed generalised tonic-clonic convulsion and sudden blindness in both eyes. She had no past history of hypertension or nephritis, though her blood pressure was elevated (highest reading, 178/105 mm Hg; and treated with antihypertensive medication) 3 days before the convulsion. An ophthalmologist was consulted urgently and a central cause of visual loss was suspected. A computed tomographic scan of her brain showed bilateral hypodense lesions in the occipital lobe (Fig 1). Magnetic resonance imaging (MRI) was performed 1 day later and this demonstrated T2-hyperintense lesions on both sides of her brain, mainly in the parieto-occipital regions (Fig 2). These lesions were not hypointense on apparent diffusion coefficient (ADC) images (Fig 3), however. The MRI findings were consistent with vasogenic oedema. It was confirmed that the serum cyclosporine level was elevated (327 ng/mL; reference range, 100-250 ng/mL) and posterior reversible encephalopathy syndrome (PRES) was diagnosed. Her vision recovered dramatically on ceasing the cyclosporine. A follow-up MRI examination was performed 4 months later and confirmed complete resolution of the brain lesions (Fig 4).

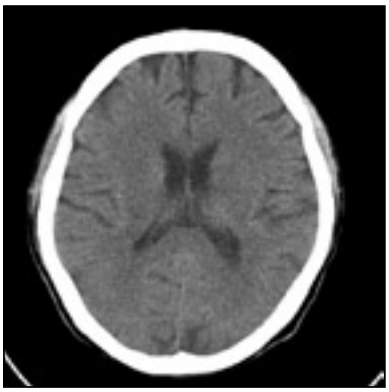

FIG 1. Axial plain computed tomography of the brain showing bilateral hypodense lesions in the parieto-occipital region

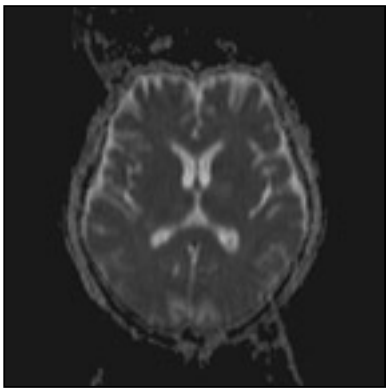

FIG 3. Axial apparent diffusion coefficient image at the same level as Fig 2 demonstrating no corresponding hypointensities in the lesion; they were not diffusion restricted

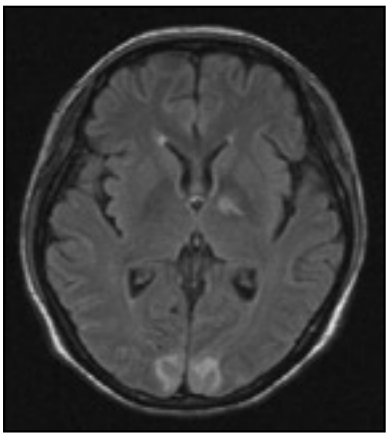

FIG 2. Axial FLAIR (fluid attenuated inversion recovery) image showing bilateral T2 hyperintense lesions at the parieto-occipital region of brain
There was a similar lesion in the anterior aspect of the left thalamus

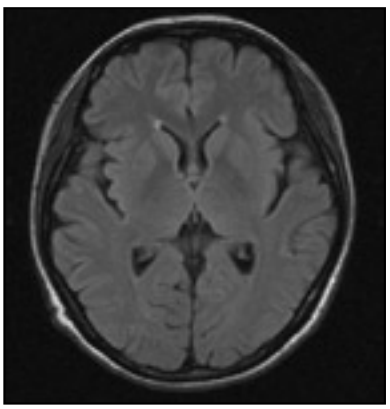

FIG 4. Axial FLAIR (fluid attenuated inversion recovery) image on follow-up magnetic resonance imaging 4 months later demonstrating complete resolution of the T2 hyperintense lesions on both sides of the parieto-occipital region of the brain

Discussion

Since Hinchey et al first described it in 1996,[1] PRES has become an increasingly recognised disease entity. Clinically, the patient usually presents with the acute onset of neurological problems like headache, convulsion, and visual impairment or blindness.

Posterior reversible encephalopathy syndrome has been reported in association with a number of situations, including the presence of hypertension, pre-eclampsia, eclampsia, use of immunosuppressive therapy, connective tissue disease, transplantation, infection, and uraemia. The pathophysiology of the disease is not yet well understood. It is believed to be multi-factorial with the end result being vasogenic oedema of the brain tissue; mixed vasogenic and cytotoxic oedema has been found in patients with poorer prognoses and permanent neurological deficits.[2]

Autoregulatory failure with resultant vasodilation, as seen in hypertensive encephalopathy, is often cited as the underlying mechanism.[3] On the other hand, vasospasm with ischaemic change is also observed in some patients.[4] Moreover, explanations for immunosuppressant-induced PRES are yet to be proved.

As the disease may be reversed by initiation of appropriate treatment, it is important to make a

timely diagnosis to prevent progression to permanent damage. Magnetic resonance imaging is the modality of choice for diagnosing PRES. It is both sensitive to and specific for vasogenic oedema. The lesions are bright on T2-weighted imaging and typically involve the parietal and occipital regions bilaterally, though other parts of the brain and unilateral involvement have been reported. While seeing an abnormal, hyperintense T2-weighted signal on MRI is not specific for PRES, the lesion is characteristically not a diffusion-restricted one. Diffusion-restricted lesions appear dark or hypointense on ADC images. Because PRES lesions are not diffusion restricted, they may be isointense or hyperintense rather than dark on ADC images. Therefore, diffusion-weighted imaging can help to distinguish PRES from other major diseases like infarction that should be diffusion restricted and dark on ADC images.

There have been a number of reports of patients with SLE developing PRES. There seems to be an association with several different factors in this group of patients. Most of the SLE patients with PRES had hypertension and renal insufficiency. Even though some patients were also treated with immunosuppressive medication, Leroux et al[5] could not be sure of the specific role of the drugs in the development of the disease as treatments were always given for SLE flare-ups when there was renal involvement. Our patient had transient elevated blood pressure 3 days before she developed neurological symptoms, but we believe the elevated serum cyclosporine level and dramatic neurological recovery on withdrawal of cyclosporine clearly indicate the drug's causative role in the development of PRES. Cyclosporine has numerous side-effects that can contribute to the development of PRES, including nephrotoxicity, hypertension, and neurotoxicity.

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