LETTER TO THE EDITOR

To The Editor

Brainstem Posterior Reversible Encephalopathy Syndrome in an Asymptomatic Patient

Keywords: Brainstem posterior reversible encephalopathy syndrome, Hypertensive encephalopathy, Hypertension, Central-variant PRES

Posterior reversible encephalopathy syndrome (PRES) refers to a clinic-radiological syndrome characterized by acute onset of neurological symptoms associated with typical magnetic resonance imaging (MRI) findings of white matter vasogenic edema.[1,2] Hyperintense signal on both T2-weighted/fluid attenuation inversion recovery (FLAIR) images over parietal and occipital lobes predominantly and isointense signal on diffusion-weighted imaging (DWI) sequences are typical features.[2] Hypertension, renal failure, pre-eclampsia or eclampsia, autoimmune diseases, sepsis, and immunosuppressive or cytotoxic drugs are the most commonly identified causes.[2] Both symptoms and neuroimaging abnormalities are usually reversible if this condition is promptly recognized.[2] Here we describe a case of atypical central-variant PRES due to severe hypertension in an asymptomatic subject.

A 66-year-old male with no significant past medical history was recruited as a research control subject at the Neurology Unit, University of Catanzaro and underwent brain MRI according to our protocol.[3] Surprisingly, physical examination revealed asymptomatic high blood pressure (220/160 mmHg). The neurological examination was unremarkable. Extensive laboratory tests were normal except for urine protein concentration (30 mg/dl, reference value 0–20). Autoimmune and infectious (HIV, Borrelia, Brucella, Listeria, Herpes Simplex Virus 1-2, Varicella-Zoster Virus antibodies) markers were negative. Chest X-ray, transthoracic echocardiography, abdominal ultrasound, and renal arteries Doppler ultrasound were normal. Electroencephalography, visual and brainstem auditory evoked potential examinations were normal.

Brain MRI (1.5T Achieva, Philips Healthcare, Best, The Netherlands) showed diffuse areas of hyperintensity on T2/FLAIR images mainly over the entire pons, which appeared swollen, as well as over right cerebellar hemisphere, thalami, periventricular white matter, corona radiata, and centrum semiovale bilaterally (Figure 1(A)) without contrast enhancement. DWI did not show abnormalities. The patient was acutely treated with antihypertensive medications (bisoprolol 2.5 mg, telmisartan 80 mg, nifedipine 30 mg, and furosemide 25 mg). Blood pressure quickly normalized (125/80 mmHg) within 48 h. Three weeks later, brain MRI showed complete disappearance of the signal alterations previously observed (Figure 1(B)).

This case represents a teaching case of a central-variant PRES confined mainly to the pons in an asymptomatic patient. Atypical distribution with exclusive involvement of brainstem, basal ganglia, or periventricular white matter with sparing of the parieto-occipital cortex and subcortical white matter has been reported very rarely[4–8] and exclusively in symptomatic patients (i.e. uncontrolled hypertension, renal disease, chemotherapy, or immunosuppressive therapy). The exact pathophysiological mechanism of PRES is still under discussion. The vasogenic edema in PRES may be due to an increase of blood pressure exceeding cerebral blood flow autoregulation limits that may cause endothelial damage and subsequent blood–brain barrier dysfunction as in our case. Alternatively, the endothelial dysfunction and brain edema may depend on an immune-mediated mechanism induced by circulating endogenous or exogenous toxin.[2] The higher susceptibility of the posterior regions may be due to the relatively poorer sympathetic innervation of the posterior vertebrobasilar circulation.[2,4] It has been suggested that a moderate hypertension mainly involves supratentorial white matter, whereas a severe, rapid increase in blood pressure could produce a predominantly subtentorial edema because of an unknown increased susceptibility of smaller perforating vessels of brainstem and basal ganglia.[5,7] Our case nicely shows a pattern of clinicoradiological dissociation, with a complete absence of symptoms despite the severity of brain abnormalities on MRI. Our incidental diagnosis suggests that cerebral vasogenic damage in PRES can have a variable preclinical asymptomatic phase and that pathophysiologic changes other than vasogenic edema may be required to induce symptomatic cerebral dysfunction. Furthermore, it may be that symptoms in central-variant or brainstem PRES may not be strictly related to the brainstem lesion distribution, as previously observed,[5] but instead dependent on late complications such as obstructive hydrocephalus, ischemic cellular damage, or hemorrhagic lesions. In our patient, prompt antihypertensive treatment produced a complete resolution of radiological abnormalities, confirming that PRES is a largely reversible condition, and physicians should be aware of this possibility when there is a great dissociation between imaging and clinical findings.

Brain MRI with DWI sequences represents a fundamental tool to distinguish PRES from other possible diagnostic entities, and recognition of atypical variants of PRES is important both for

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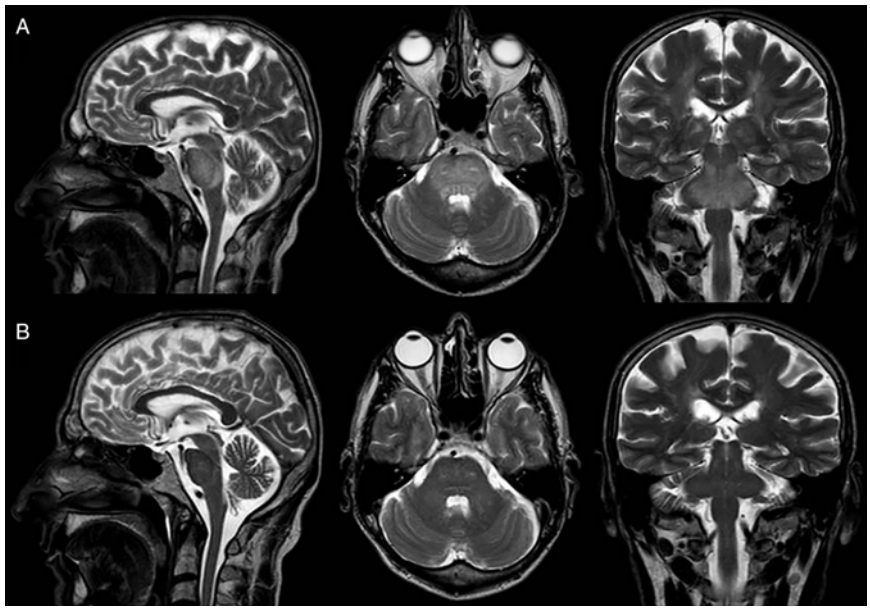

Figure 1: *Brain MRI before and after treatment. (A) 1.5 Tesla brain MRI, before treatment. Axial, sagittal, and coronal T2-weighted images show the presence of a swollen pons with diffuse hyperintensity of the whole pons corresponding to vasogenic edema. (B) 1.5 Tesla brain MRI, 3 weeks after treatment. Axial, sagittal, and coronal T2-weighted images show disappearance of the previous hyperintensity of the whole pons due to regression of the previous edema.*

avoiding unnecessary investigations and for appropriate management. Prompt treatment is important to reverse brain edema and to avoid potentially life-threatening complications.

Ethics Approval and Consent to Participate

The study was performed according to the ethical standards laid down in the 1964 Helsinki Declaration and its later amendments. Written informed consent was obtained from the patient.

Conflict of Interest

The authors report no conflict of interests.

Statement of Authorship

AP, US, and AL collected, analyzed, and interpreted the patient data. AP and AL wrote the manuscript. AQ and US contributed to the writing of the manuscript. US and AL selected the image. AG supervised and critically revised the manuscript. As a corresponding author, AL designed this study and supervised the work. All authors read and approved the final manuscript.

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