INTRODUCTION

Posterior reversible encephalopathy syndrome (PRES) is a neurotoxic state coupled with a variety of symptoms and distinct MR imaging appearance. Condition is recognized in the setting of a number of complex clinical conditions. There has been some controversy about what the proper term should be for this clinicoradiologic entity, a new name, posterior reversible encephalopathy syndrome (PRES), has been coined. Clinical symptoms at presentation are wide. Common symptoms include headache, vision change, paresis, nausea, and altered mentation. Generalized seizures are common and may lead to coma. Symptoms may develop over several days or may be recognized only in the acute setting. Moderate-to-severe hypertension is present in 70-80% of patients.

On CT or MR imaging studies, symmetric and often widespread hemispheric watershed vasogenic oedema is noted that predominates in the parietal and occipital lobes followed by the frontal lobes, the inferior temporo-occipital junction, and the cerebellum. Lesion confluence may develop as the extent of oedema increases. MR diffusion-weighted imaging (DWI) plays an important role in demonstrating vasogenic oedema. The oedema usually completely reverses.

Since, PRES is most of the time not suspected clinically and its imaging findings may lead to incorrect diagnosis of infarcts, recognition of the characteristic imaging findings by radiologists is key to diagnose this syndrome and can prevent harmful clinical work-ups and therapies.

CASE REPORT

A 35-year-old woman (gravid 3, para 2) developed hypertension in the third trimester (37th week of gestation) with blood pressure of 210/110 mmHg and oedema of both the legs. Three days after admission, patient had two generalized tonic-clonic seizures and also developed proteinuria. A diagnosis of eclampsia was made. Patient was treated with antihypertensive (Hydralazine) and antiepileptic medicines (Magnesium sulfate) and baby was delivered through C-section. On the first postpartum day, she complained of a rapidly developing severe headache, a transient visual loss in her visual field and another episode of generalized tonic-clonic seizure. MRI scan of the brain was performed. It showed areas of hyperintense signal on T2WI, FLAIR sequence (Figure 1) and hypo-intense signal on T1WI (Figure 2) in the occipital lobes bilaterally sparing calcarine and paramedian parts of the occipital lobes. Magnetic resonance arteriography/venography (MRA/MRV) were normal, whereas DWI revealed increased apparent diffusion coefficients (ADCs) in the involved regions suggesting vasogenic oedema in these areas. There was no evidence for an intracranial sinus thrombosis on MRV. A diagnosis of PRES was made. Patient remained admitted in ICU for another week. The newborn baby was shifted to NICU where he remained free of complications. Patient improved symptomatically and

ABSTRACT

Posterior reversible encephalopathy syndrome (PRES) is a clinicoradiologic entity. Neurotoxicity with characteristic watershed CT/MR imaging features characterize this condition. This case report describes PRES syndrome in a 35-year-old patient admitted with eclampsia. On the first postpartum day; she developed severe headache, generalized tonic-clonic seizures and visual symptoms including transient visual loss. MRI scan of the brain showed symmetric areas of hyperintense signal on T2-weighted images in the occipital lobes bilaterally. Patient improved symptomatically. Repeat MRI of the brain 4 months after initial admission showed resolution of the previous abnormalities.

Key words: Posterior reversible encephalopathy (PRES). Generalized tonic-clonic seizures. Eclampsia. MRI. Occipital lobe oedema.
was shifted to gynaecology ward and later discharged. Her blood pressure also returned to normal limits. No specific therapy was given. Repeat MRI of the brain 4 months after initial admission showed almost complete resolution of the previous abnormalities.

DISCUSSION

Neurotoxicity with characteristic watershed CT/MR imaging features characterizes posterior reversible encephalopathy syndrome. The main clinical features of PRES are headache, altered sensorium, seizures, vomiting, visual disturbances (hemianopsia, visual neglect, cortical blindness), and focal neurological deficit. Major PRES-associated clinical conditions include pre-eclampsia / eclampsia, infection / sepsis / shock, autoimmune diseases, bone marrow transplantation, solid organ transplantation, hypertensive and high-dose cancer chemotherapy. Additional considerations have been suggested in numerous case reports.

The association of PRES with eclampsia and pre-eclampsia is well established. Delayed eclampsia (PRES within several weeks after delivery) can also occur, and the clinical presentation is often confusing. Blood pressure may be normal or mildly elevated. Severe headache is common. Conventional angiography is often performed to exclude intracranial aneurysm. In this case, the patient was already a diagnosed case of eclampsia. She developed neural symptoms during first 24 hours postpartum.

The pathophysiology of PRES is under debate and is not yet understood, but it is related to disordered cerebral autoregulation, hypertension and hyperperfusion. Cerebral vasospasm results in cytotoxic oedema, whereas vasodilatation results in vasogenic oedema. Vasogenic oedema is more favoured by most experimental and clinical data. Although hypertension/hyperperfusion theory is most popular but some queries do exist. Hypertension is not essential and PRES is seen in 20-40% of patients in the absence of hypertension. In the remainder, though some degree of hypertension is present but not reaching or crossing the limit that can lead to disturbed autoregulation. Numerous recent studies have mentioned little vasogenic oedema in severely hypertensive patients when compared with normotensive patients, contrary to the expected result if severe hypertension with failed autoregulation was the mechanism behind PRES. In this case the patient was having severe hypertension with BP of 210/110 mmHg. The mechanism responsible for the imaging appearance remains unclear and controversial.

PRES primarily affects the subcortical white matter; however, the cortex and the basal ganglia may also be involved. In this patient, the occipital cortex and adjacent subcortical white matter was involved bilaterally and symmetrically. The most distinguishing imaging pattern in PRES is the presence of relatively symmetric oedema involving the hemispheric white matter. Involvement of parieto-occipital regions is more common sparing calcarine and paramedian parts of the occipital lobes, as in this case. Other parts of the brain including brain stem, cerebellum, basal ganglia, deep white matter (internal and external capsule), frontal and temporal lobes can also get involved in the process with varying degree of severity. In complicated cases gyriform signal enhancement or parenchymal haemorrhage has been mentioned. Recently, studies with diffusion-weighted sequences and diffusion-tensor sequences have shown increased apparent diffusion coefficients (ADCs) in the involved regions accompanied by anisotropy loss, which suggests reversible vasogenic oedema as an underlying pathophysiology.

MR imaging with diffusion-weighted sequences provides not only a powerful means of diagnosing PRES but also a wealth of prognostic information about the patient. Vasogenic oedema can be reliably differentiated from cytotoxic oedema in other etiologies by using DWI and by calculating the ADC map, which shows elevated ADC values. Diffusion-weighted images may show foci of high signal intensity in cortex that is either undergoing infarction or at high risk of infarction. ADC values in these areas are normal or slightly elevated.

MRA findings can show findings suggestive of vasculopathy. Biopsy/autopsy findings include vasogenic oedema. Activated/reactive astrocytes, scattered macrophages, and lymphocytes have been reported without inflammation, ischaemia, or neuronal damage. Acetylaspartate creatinine ratios have been described by MR spectroscopy in regions of PRES vasogenic oedema as well as in unaffected regions. Quantitative metabolite assessment in 2 patients demonstrated an absolute reduction of metabolite concentration (considered a dilution effect from vasogenic oedema), which corrected in 1 patient on follow-up MR spectroscopy. Abnormal metabolite ratios may persist. Lactate has been reported in PRES, and when accompanied by vasoconstriction, a contribution from ischaemia has been suggested.

REFERENCES

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Figure 2: Axial T1WI showing symmetrical hypo-intense signal in the occipital lobes bilaterally.


