Posterior Reversible Leukoencephalopathy

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Abstract

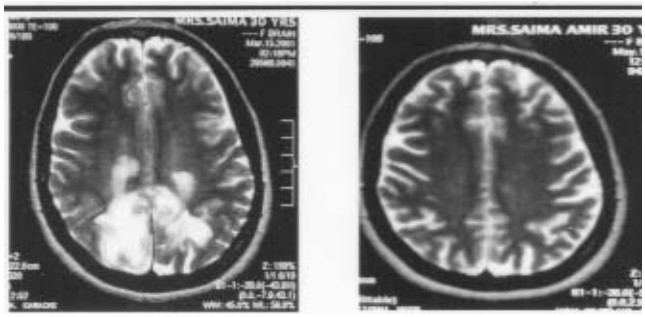
Posterior Leukoencephalopathy is a rare, though reversible complication of eclampsia. We report two cases, in which patients with eclampsia presented with seizures, visual disturbances and focal neurological signs with high intensity areas predominantly in parieto-occipital white matter on cranial MRI, where successful control of blood pressures led to complete resolution of neurological deficits as well as radiological abnormalities. It is an infrequently recognized neurological disorder, not known to many physicians, which has almost complete recovery with early diagnosis and treatment. The purpose of presenting this case series is to highlight the importance of early recognition and treatment of this potentially reversible disorder.

Introduction

Posterior reversible encephalopathy syndrome (PRES), reversible posterior leukoencephalopathy syndrome (RPLS), posterior reversible leukoencephalopathy are all terms that have been used to describe group of disorders that present clinically as headache, seizures, visual changes, altered mental status and occasionally focal neurological signs, with symmetrically distributed areas of vasogenic oedema predominantly affecting white matter in posterior circulation areas.[1-3] It is an infrequently recognized neurological disorder, not known to many physicians, which has almost complete recovery with early diagnosis and treatment.[1-4] The purpose of presenting this case series is to highlight the importance of early recognition and treatment of this potentially reversible disorder.

Case 1

A thirty years old primigravida developed pre-eclampsia at week 24 of gestation with no previous history of hypertension and renal insufficiency. Her condition deteriorated further at 32 weeks gestation when she had two episodes of generalized tonic clonic seizures with worsening blood pressure (180/100mmHg) prompting hospitalization and subsequent emergency caesarean section. Approximately 12 hours after the surgery she developed diffuse headache, bilateral visual loss and left sided hemiparesis. At that time her B.P. was 170/100mmHg, she had generalized oedema, was conscious with cortical blindness (papillary reflexes and normal fundii), left seventh nerve facial palsy (UMN type) and was unable to move her left side against resistance (strength 3/5 according to MRC), with extensor plantar. Her routine workup revealed 4g proteinuria per 24 hours urine sample. EEG showed diffuse generalized slowing. MRI brain done 24 hours after presentation showed white matter signal abnormalities in bilateral parieto-occipital region (Figure lA). Antihypertensive treatment was initiated immediately: Tab Captopril 25mg TID, Tab. Metoprolol Tartrate 100mg BID, was given



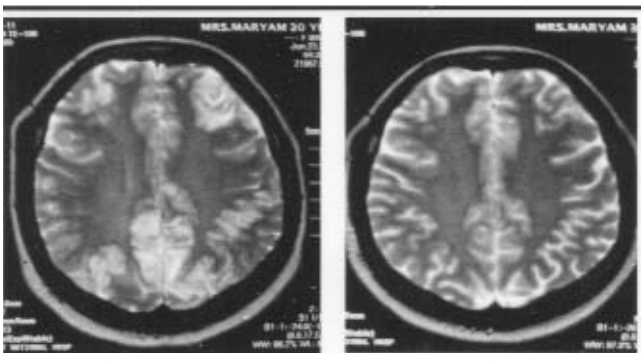
1.A 1.B

Figure 1. A. Axial T2-weighted MR image demonstrates abnormal high intensity signals in bilateral parieto-occipital region. B. Follow up scan shows that all radiological abnormalities have completely resolved.

along with Magnesium sulfate. Her vision improved in 3 days, there were no further seizures, with complete return of motor function in two weeks. Repeat neuroimaging was unremarkable for any abnormality (Figure IB).

Case 2

A 30 years old female, with recent history of emergency caesarean section due to pre-eclampsia, developed generalized headache, blurring of vision, and three episodes of generalized tonic clonic seizures, around eight days after the surgery. At the time of presentation her BP was 160/110mmHg, she had pedal oedema, was alert, with only focal neurological exam being right facial droop and positive pronater drift on right side. Rest of the neurological exam including fundii was normal. The routine tests showed 2 + protein on urine analysis. MRI brain demonstrated bilateral abnormal intensity signals in fronto-parietal, temporal and occipital region (Figure 2A), MRA and MRV were normal. Workup for hypercoagulable state was also done as she had a history of recurrent abortions, and the results were unremarkable. Her blood pressure was successfully controlled with Tab Hydralazine 25 mg TID and tab Captopril 25 mg TID. Her neurological deficit improved in one week. Repeat MRI done 12 days after initial neuroimaging showed complete resolution of lesions (Figure 2B).



2.A 2.B

Figure . A. Axial T2weighted MR image shows widespread white matter signal abnormalities in bilateral fronto-parietal, temporal, occipital. B. Repeat imaging done 12 days after first scan shows complete resolution of abnormalities.

Discussion

Posterior leukoencephalopathy is a rapidly evolving neurological condition which was first described in 1996 by Hinley et al[4] in a retrospective study of 15 patients with headache, seizures, altered sensorium and visual disturbances. He proposed the name reversible posterior leukoencephalopathy (RPLS). Since then several terms have been used to describe this syndrome, PRES being the most recent.[4,5]

Eclampsia is one of the major causes of posterior leukoencephalopathy, besides hypertensive encephalopathy, renal disease, and immunosuppressive and cytotoxic agents like cyclosporine, tacrolimus and interferon alpha.[3-6] Less common causes are vasculitis, TTP, ITP, acute intermittent porphyria, endocrine disorders like pheochromocytoma and primary hyperaldosteronism, haemolytic uraemic syndrome, thermal injury, hypercalcaemia, blood transfusion and following organ transplantation, antiretroviral therapy, intravenous immunoglobulin and nitroglycerin, erythropoietin, granulocyte stimulating factor and over the counter CNS stimulants like phenylpropanolamine, ephedrine and pseudoephedrine.[5-7]

Pathogenesis involves vasogenic oedema that usually results from increase in blood pressure, causing disturbance of cerebral autoregulation, dilatation of cerebral arterioles with opening of tight junctions and leakage of fluid into ECF,[8,9] or uncommonly it may result from direct damage to blood brain barrier by cytotoxic agents.[3] Cerebral white matter is more susceptible to vasogenic edema because it is mainly composed of gliat tissue and has poor sympathetic innervation of posterior circulation.[4,10] Incidence is higher in females,[3] and is observed more during perpeureum rather than pregnancy, fluid accumulation often observed during this period possibly accentuates the tendency for brain oedema.[4]

The main clinical features of PRES and headache, altered sensorium, seizures, vomiting, visual disturbances (hemianopia, visual neglect, cortical blindness), and focal neurological deficit. Seizures are usually multiple, generalized tonic clonic type and precede other symptoms.[3,4] The lesions of PRES are best visualized on MR imaging, which is able to show even small abnormalities. Neuroimaging at the height of symptoms show diffuse oedema predominantly in parieto-occipital region, however in those with extensive disease involvement of other structures like brainstem, basal ganglia, cerebellum and frontal lobes can also be seen. MRI

lesions are often symmetric, low to isointense on TI, and hyperintense on T2.[3] The extent of T2 and diffusion weighted imaging (DWI) signal abnormalities correlate with patient's outcome. High DWI signal intensity and pseudo-normalized ADC (ADC values that were paradoxically normal) may represent the earliest sign of non-reversibility as severe vasogenic oedema progress to cytotoxic oedema.[1]

Main clinical conditions to be differentiated in order of preference are bilateral posterior cerebral artery stroke, cerebral venous thrombosis, encephalitis, and demyelinating disorders.[3] Posterior leukoencephalopathy needs to be recognized promptly, as the syndrome is reversible with aggressive control of blood pressure (10-20%) decrease in mean arterial pressure is sufficient to terminate the process), treating associated metabolic abnormalities or by decreasing or even discontinuing offending immunosuppressive agents if needed.[3] Patients usually remain seizure free after resolution of imaging abnormalities and do not require chronic anti-epileptic treatment. When unrecognized, the disease can progress to ischaemia massive infraction and death.[3]

Conclusion

Posterior leukoencephalopathy is an uncommonly recognized neurological syndrome complicating various medical disorders, use of immunosuppressive agents and list of other medications. Early recognition and treatment can revert both neurological deficits, as well as radiological abnormalities, which was achieved in cases reported by prompt intervention. If appropriate management is delayed, there is a great risk of permanent neurological damage due to ensuing cerebral infraction.

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