Atypical Posterior Reversible Encephalopathy Syndrome (PRES) in de novo Late Post-Partum Eclampsia

Laxman G Jessani1, Aumir Moin2, Shivaprasad Karnati3, Keshavamurthy3

Abstract
Here we report two patients with late post-partum eclampsia without pre-existing preeclampsia presenting with atypical features of posterior reversible encephalopathy syndrome (PRES) which was diagnosed by serial MRI with good outcome emphasizing the fact that early diagnosis and treatment can prevent complications.

Introduction
Posterior reversible encephalopathy syndrome (PRES) is a clinicoradiological entity characterized by headaches, altered mental status, seizures, and visual disturbances and is associated with characteristic reversible lesions on neuroimaging in a severe arterial hypertension setting. Preeclampsia refers to a syndrome characterized by new onset of hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman. Eclampsia refers to the occurrence of one or more generalized convulsions and/or coma in the setting of preeclampsia and in the absence of other neurological conditions which can appear anytime from the second trimester to the puerperium. Postpartum eclampsia is a rare and under-recognized condition and can either be early (within 48 hrs of delivery) or late postpartum eclampsia (greater than 48 hours, but less than four weeks postpartum). Late postpartum eclampsia may occur without any pre-eclamptic prodromes, including proteinuria.

Typically, PRES involves the parieto-occipital lobes. When regions of the brain other than the parieto-occipital lobes are predominantly involved, the syndrome is called atypical PRES which is rare. Although most women are hypertensive at toxicity, blood pressure is reported as normal or only minimally elevated in 23% of patients, and the clinical presentation is often confusing. PRES is known to be associated with postpartum eclampsia, but atypical PRES occurring in post-partum period, to date described only in few isolated cases. Delay in diagnosis and treatment can lead to ischemic or hemorrhagic lesions leading to permanent neurological damage.

In this article we report two patients with late post-partum eclampsia without pre-existing preeclampsia (de novo) presenting with atypical features of posterior reversible encephalopathy syndrome (PRES) which was diagnosed early by serial MRI with good outcome emphasizing the fact that early diagnosis and treatment can prevent complications and raise attention for a possible rare association between atypical PRES and de novo late post-partum eclampsia.

Case History

Case 1
In July 2010, a 25-year old lady, primigravida, at term with no significant past medical history presented on the 3rd day of postpartum with h/o sudden onset of giddiness, headache, vomiting, bilateral blurring of vision followed by generalized tonic-clonic seizure. She had regular ANC checkup and her BP was within normal limits. Blood and urine routine assays were normal, and no proteinuria was detected during both the pregnancy and puerperium. She underwent emergency LSCS for Persistent Occipito-posterior position and delivered a healthy male baby and her BP both during her surgery and postpartum period was normal. On examination her arterial blood pressure was 130/90 mm Hg. She was in post-ictal state and after she regained consciousness was noticed to have cortical blindness. Cranial CT scan done revealed diffuse cerebral edema with hypodensities of bilateral parieto-occipital subcortical white matter and MRI Brain (Figure 1) done showed hyperintense lesions (in T2 and FLAIR sequences) involving white matter in bilateral parieto-occipital, bilateral cerebellum, patchy bifrontal regions and gray matter involving bilateral caudate, globus pallidus and right thalamus which were showing free diffusion. MR venography done to evaluate the deep venous system was normal. Other investigations were done to rule out secondary causes of hypertension. The patient was treated with IV labetalol, oral antihypertensives, foscarnet and antiedema measures. In subsequent days her BP was controlled and she recovered from her blindness gradually. With antiedema measures and BP control she improved and was discharged in stable condition with oral nifedipine for 2 weeks. MRI brain (Figure 2) done 6 weeks later revealed normal study.

Case 2
In March 2013, a 21-year old lady, primigravida with 30 wks gestation, with no significant past medical history presented on the 6th day of postpartum with h/o sudden onset of headache, vomiting, bilateral blurring of vision followed by recurrent generalized tonic-clonic seizure. She had regular ANC checkup and her BP was within normal limits. Blood and urine routine tests were normal, and no proteinuria was detected during both the pregnancy and puerperium. She underwent emergency LSCS for PROM delivered a still-birth and her BP both during her surgery and postpartum period was normal. On examination her arterial blood pressure was 130/90 mm Hg. She was in post-ictal state and after she regained consciousness was noticed to have cortical blindness. Cranial CT scan done revealed diffuse cerebral edema with hypodensities of bilateral parieto-occipital subcortical white matter and MRI Brain (Figure 1) done showed hyperintense lesions (in T2 and FLAIR sequences) involving white matter in bilateral parieto-occipital, bilateral cerebellum, patchy bifrontal regions and gray matter involving bilateral caudate, globus pallidus and right thalamus which were showing free diffusion. MR venography done to evaluate the deep venous system was normal. Other investigations were done to rule out secondary causes of hypertension. The patient was treated with IV labetalol, oral antihypertensives, foscarnet and antiedema measures. In subsequent days her BP was controlled and she recovered from her blindness gradually. With antiedema measures and BP control she improved and was discharged in stable condition with oral nifedipine for 2 weeks. MRI brain (Figure 2) done 6 weeks later revealed normal study.
normal. On examination, her blood pressure was 140/90 mm Hg. She was in post-ictal state. Cranial CT scan done revealed diffuse cerebral edema with hypodensities of bilateral parieto-occipital subcortical white matter and MRI brain (Figure 3) done revealed bilateral hyperintensities (in T2 and FLAIR sequences) in occipitoparietal and basal ganglia regions. MR venography done to evaluate the deep venous system was normal. Other investigations were done to rule out secondary causes of hypertension. RF and ANA done were negative. The patient was treated with IV labetalol, oral antihypertensives, fosphenytoin and antiedema measures. With antiedema measures and BP control she improved and was discharged in stable condition with oral nifedipine for 2 weeks. MRI brain (Figure 4) done 6 weeks later revealed normal study.

**Discussion**

Posterior reversible encephalopathy syndrome (PRES) was first reported by Hinchey et al in 1996.† The rate of increase of blood pressure (BP) is a more important factor in the development of PRES than the absolute BP levels. It may occur due to a number of causes predominantly malignant hypertension, eclampsia, drugs such as tacrolimus, cyclosporine, autoimmune disease and patients undergoing organ transplant.2

The most common clinical symptoms and signs are headache, altered alertness and behavior changes ranging from drowsiness to stupor, seizures, vomiting, mental abnormalities including confusion and abnormalities of visual perception.1 Seizures may begin focally but usually become generalized.

Classically PRES is characterized by hyperintensity on T2-weighted and FLAIR images bilaterally and symmetrically in the parieto-occipital regions which is caused by subcortical white matter vasogenic edema. When regions of the brain other than the parieto-occipital lobes are predominantly involved, the syndrome can be called atypical PRES which is rare.2 Additional areas of the brain in patients with PRES that has been reported includes brain stem, cerebellum, basal ganglia, and frontal lobes.2 Atypical imaging appearances include contrast enhancement, hemorrhage, unilateral and restricted diffusion on MRI and involvement of gray matter.1,4

Two theories have been proposed to explain the pathophysiology. The more popular theory suggests that hypertension leads to failure of autoregulation, subsequent hyperperfusion, and vasogenic edema.1 The other theory suggests that vasoconstriction and hypoperfusion leads to brain ischemia and subsequent vasogenic edema. The relative paucity of sympathetic innervations in the posterior brain results in increased susceptibility to hyperperfusion and vasogenic edema during acute blood pressure elevations.3 Most authorities believe that hypertensive encephalopathy and eclampsia share similar pathophysiologic mechanisms.3

In our case, the differential diagnoses were cerebral infarct, cerebral venous sinus thrombosis, subarachnoid hemorrhage and central nervous system infection. Emergent head MRI and MRI venogram was indicated to clarify all these etiologies. Our MRI findings were characterized by a vasogenic edema involving subcortical white matter and deep gray matter data suggestive of atypical PRES in late postpartum eclampsia. Our diagnosis of PRES was confirmed by demonstrating reversible hyperintensity on serial MRI. In both of our patients who had follow-up MRI imaging there was resolution of white-matter abnormalities, suggesting transient edema rather than infarction.

---

**Fig. 1:** Case 1: MRI brain FLAIR(A), T2(B), Diffusion(C) and apparent diffusion coefficient (D) showing changes in bilateral caudate, anterior limb of internal capsule, right thalamus and bilateral parieto-occipital subcortical white matter

**Fig. 2:** Case 1: Follow up MRI brain T2 (A) and FLAIR(B) same areas in Fig. 1 being normal
Changes in diffusion-weighted magnetic resonance imaging (DWI) and apparent diffusion coefficient (ADC) in posterior reversible encephalopathy is well documented, and can successfully differentiate PRES from early cerebral ischemia. DWI is the study of choice in PRES to discriminate between vasogenic and cytotoxic edema, thereby, being helpful as a screening imaging methodology in the setting of ischemic complications of PRES in identifying irreversible tissue damage. ADC mapping can be useful to rule out other conditions that can mimic PRES, such as central pontine myelinolysis.

Eventhough etiology of the syndrome may be heterogeneous, the treatment of this syndrome can be achieved under the same roles: blood pressure control, seizure control, removing the disposing factors, and supportive care. If these problems can be controlled early enough, the patient can usually have a complete recovery without detectable neurological sequela and abnormal head MRI findings can be reversed as well. However, if the vasogenic edema of the damaged brain tissue persisted for a long time or the severity of damage is strong and extensive, the evolution of vasogenic brain edema to cytotoxic brain edema may develop, and it may lead to irreversible damage to neurons.

The difficulty in diagnosis of late postpartum eclampsia is that there are no preceding symptoms during or after delivery. In our case with postpartum status, the symptoms of eclampsia were not so typical. The initial blood pressure recordings were not markedly elevated, leg edema was not found, and no proteinuria was noted. Women with eclampsia after delivery usually have lower blood pressures, minimal proteinuria, and significantly higher incidence of neurological deficits than those with earlier-onset of eclampsia.

After an extensive literature review we found that post-partum eclampsia associated with atypical PRES to date has been described only in few isolated cases, or may have been underreported or missed.

We present this case here for the following reasons:

Late postpartum eclampsia accounts for a small percentage of all eclampsia cases.

PRES as a syndrome is not so familiar to most clinicians and atypical features of this reversible condition can be easily misdiagnosed with vertebrobasilar ischemia, cerebral venous thrombosis and metabolic diseases.

In the postpartum period when headaches and/or visual changes are associated with eclampsia with or without pre-existing preeclampsia one needs to be aware of the possibility of PRES as diagnosis, even if the pregnant patient had no prior history of hypertension or proteinuria and MRI brain examination is recommended for early diagnosis and treatment of PRES.

Early diagnosis and treatment can prevent complications as both clinical signs and neuroradiological pattern are frequently reversible, whereas delayed diagnosis and treatment can lead to ischemic or hemorrhagic lesions with permanent neurological damage. Thus, patients should be warned of preeclampsia symptoms, not only in the antenatal period but also in the postpartum period so that this condition can be recognized early.

We would like to raise attention for a possible rare association between atypical PRES and de novo late post partum eclampsia however more studies are needed.

References