Reversible Posterior Encephalopathy Syndrome as the Presentation of Late Postpartum Eclampsia: A Case Report

Yih-Hwa Chiou and Ping-Hong Chen

Abstract- We presented a case of previous healthy postpartum woman suffering from seizure of sudden onset with conscious change and anisocoric pupils. Head magnetic resonance imaging (MRI) revealed multiple high signal-intensity lesions on fluid-attenuated inversion recovery (FLAIR) / T2 weighted image (T2WI) in bilateral subcortical white matters (especially the parieto-occipital areas), brain stem, and bilateral cerebellum, and mild high signal-intensity lesions on diffusion weighted MRI (DWI). These neurological and radiological anomalies recovered completely later. The final diagnosis was the rare presentation of late postpartum eclampsia as reversible posterior encephalopathy syndrome (RPES).

Key Words: Reversible posterior encephalopathy syndrome (RPES), Late postpartum eclampsia, Vasogenic edema

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INTRODUCTION

Reversible posterior encephalopathy syndrome (RPES), or as the previous name, parietal-occipital encephalopathy, or reversible posterior leukoencephalopathy (RPLS), refers to a clinical and radiological entity presented by headache, altered mental status such as confusion, lethargy, cortical visual disturbances, and seizures, with transient edematous changes of subcortical white matter on neuroimaging[1]. RPES will be the preferred term in this article, since lesions are not necessarily limited to the white matter[2]. Underlying clinical conditions predisposing to RPES include chronic renal insufficiency, toxemia of pregnancy, pediatric post-streptococcal glomerulonephritis, thrombotic thrombocytopenic purpura, autoimmune disorders alone or together with exposure to immunomodulating agents (cyclosporine, tacrolimus, interferon-alpha, cisplatin, cyclophosphamide, et al.)[1,3-10]. The well-known condition of eclampsia related RPES can subside immediately after the delivery. Rare case of postpartum RPES was reported[11]. We report one case of postpartum RPES without preceding eclampsia here, and this case revealed the possibility of RPES in the purperium stage.

From the Section of Neurology, Department of Internal Medicine, Far Eastern Memorial Hospital, Taiwan.
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Reprint requests and correspondence to: Yih-Hwa Chiou, MD. Section of Neurology, Department of Internal Medicine, Far Eastern Memorial Hospital, Taiwan.
E-mail: hippus.chiou@msa.hinet.net

CASE REPORT

The 25 year-old female, who denied previous major systemic disease, previous medicine use, or special exposure/traveling history, was in her postpartum period with normal spontaneous delivery for her first baby (G1P1). No significant abnormal event was noted including eclampsia, during her pregnancy and the labor period. No Chinese herb was used after her delivery. Her baby was also healthy. Headache has been noted since two days after the delivery. No concurrent fever, nausea, vomiting, blurred vision, previous head injury, or other discomfort was noted. However, her family found her suddenly lying on the ground with unconsciousness, upward gaze deviation, and tongue biting one day after an episode of sudden-onset headache at home. No convulsion was observed initially. She was sent to emergency service immediately. At emergency service, the initial blood pressure was 109/61 mmHg with heart rate of 76/min and respiratory rate of 20/min. No fever or leg edema was noted. On neurological examination, Glasgow Coma Scale (GCS) was E4M5V3-4. Neutral eye position, isocoric pupils, bilateral intact light reflex, and mild left central facial palsy were noted with normal muscle power bilaterally. Trace rigid neck was found with equivocal meningismus. The plantar reflexes were bilateral dorsiflexion in response. The blood test revealed leukocytosis (WBC= 17140) with left-shifting (neutrophil= 92.2%). Normal serum creatinine level, sodium level, potassium level, glutamic oxaloacetic transaminase (SGOT) level, glucose level, lactic acid level, and arterial blood gas data were noted. Elevated uric acid (8.7 mg/dl) and C-reactive protein (CRP) (7.27 mg/dl) level were also found. Urine routine analysis revealed some proteinuria (++). Emergent head computer tomography (CT) revealed mild diffuse brain swelling only; no obvious intracranial hemorrhage or mass lesion was seen.

After admission on the same day, sudden onset of generalized convulsion with tonic posture over bilateral upper limbs occurred and the seizure was followed with loss of consciousness. Anisocoric pupils (3/4.5 mm, larger on the left side,) with impaired light reflex on the left side were also noted. Lorazepam 1 mg intravenous push was given immediately, and convulsion was stopped after 30 seconds about. Phenytoin 750 mg intravenous loading with maintaining dose (100 mg intravenous per 8 hours) was also used. Vital sign was stable then. Empirical ceftriaxone was started. Emergent head magnetic resonance imaging (MRI) was arranged, and it revealed multiple high signal lesions on fluid-attenuated inversion recovery (FLAIR) / T2 weighted image (T2WI) in head of caudate nucleus, bilateral putamen & corona radiata, centrum semiovalis, bilateral parieto-occipital gyrus, midbrain-pontine area, bilateral cerebellum, and mild high signal on diffusion weighted MRI (DWI); vasogenic edema rather than cytotoxic edema was considered (Fig. 1). No evidence of sinus thrombosis was noted under the magnetic resonance venography (MRV) study. Lumbar puncture study was also performed. The appearance of cerebrospinal fluid (CSF) was clear and colorless. Only slightly elevated CSF opening pressure (230 mm H_2O) and mildly elevated CSF protein level (96.5 mg/dl) were found on the CSF study in detail. Serial serological study, including VDRL and autoimmune profile (C3, C4, ANA, dsDNA, antiphospholipid antibody), revealed negative finding. The electroencephalogram (EEG) study showed mild diffuse cortical dysfunction without significant epileptiform discharge, considered as postictal changes. Her blood pressure was once elevated (up to 180/100 mmHg) with agitated temper under intensive care unit monitoring. Intermittent intravenous labetalol (12.5 mg) was used to control blood pressure. Her consciousness improved gradually under medical treatment. Her alertness and awareness completely total recovered 24 hours later. Follow-up neurological examinations revealed no significant focal neurological deficits. The second head MRI study (9 days after first MRI) showed complete resolution of brain lesion on previous head MRI study (Fig. 2). Due to mild elevated systolic blood pressure (up to 150-160 mmHg), regular low dose anti-hypertensive agent (Ramipril 2.5 mg oral per day) was given. Oral phenytoin was kept with dosage of 300 mg per day. The patient was discharged under stable condition with outpatient clinic follow-up. Under consideration of the clin-

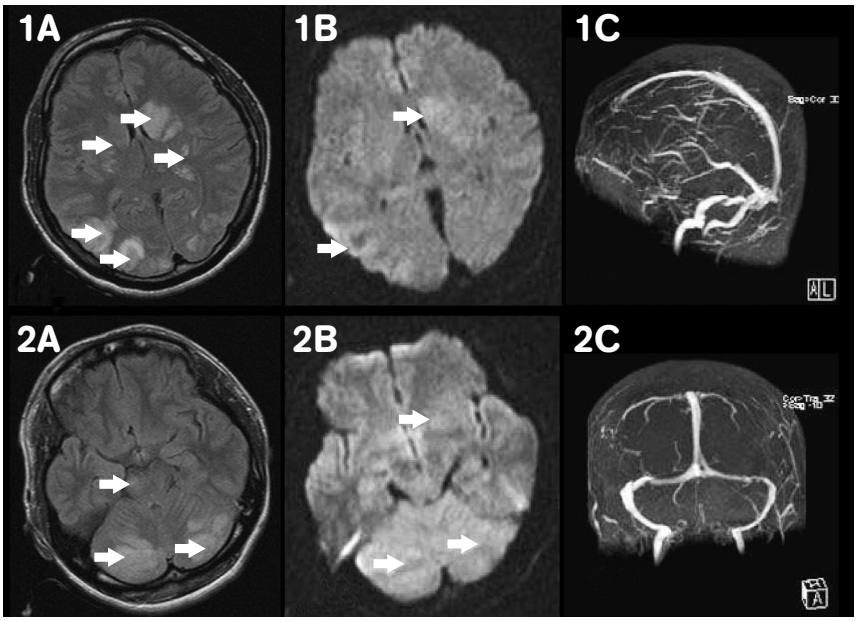

Figure 1. The first head MRI revealed multiple high signal-intensity lesions on FLAIR/T2WI in the head of caudate nucleus, bilateral putamen & corona radiata, centrum semiovalis, bilateral parieto-occipital gyrus, midbrain-pontine area, bilateral cerebellum (white arrows in Figs. 1A-2A) and mild high signal-intensity lesions on DWI (white arrows in Figs. 1B-2B). These pictures favor a process of vasogenic edema rather than cytotoxic edema is considered. No evidence of sinus thrombosis was noted under the MRV study (Figs. 1C-2C).

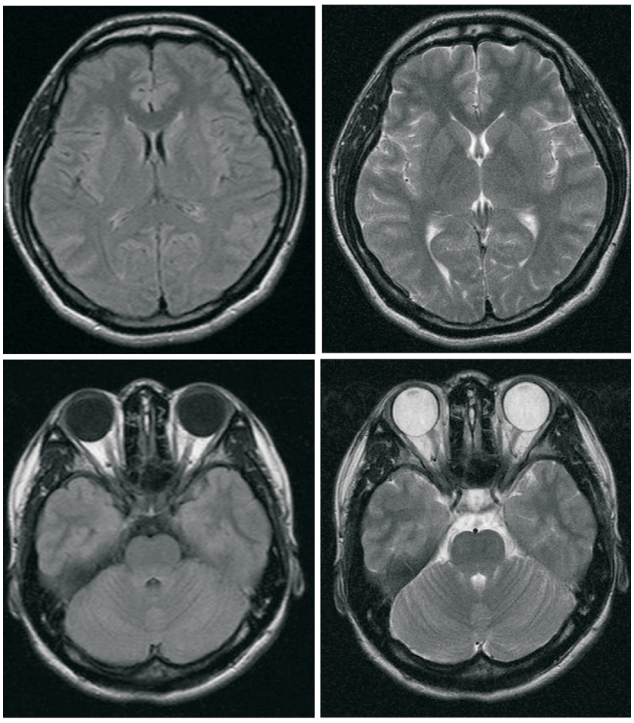

Figure 2. The follow-up head MR revealed complete resolution of brain lesion on the previous head MRI study.

ical course, specific reversible head MRI changes in serial studies, reversible posterior encephalopathy syndrome as the presentation of late postpartum eclampsia was diagnosed.

DISCUSSION

Pre-eclampsia is one of the well-known obstetric complication. It consists of hypertension (blood pressure > 140/90 mmHg) and proteinuria. In the most severe form, it may be accompanied by seizures, and termed eclampsia. Generally, eclampsia occurs either before or within 48 hours of delivery. Eclampsia occurring more than 48 hours but less than 4 weeks after delivery is known as late postpartum eclampsia, and we present this instructive case here for two reasons: (1) late postpartum eclampsia accounts for less than 15% of eclampsia[12] and (2) the syndrome it is not so familiar to most obstetric doctors, medical physician at emergent service, and neurologists. In our case with postpartum status, these symptoms of eclampsia were not so typical. The initial blood pressure was not markedly elevated, the leg edema was not found, and only mild proteinuria (++) was noted. However, patients of late postpartum eclampsia may not present with all the classical symptoms of intrapartum preeclampsia such as hypertension (blood pressure > 140/90 mmHg), proteinuria, and associated symptoms such as headache, visual changes, abdominal pain,

or edema[13]. Women with eclampsia after delivery usually have lower blood pressures, minimal proteinuria, and significantly higher incidence of neurologic deficits than those with earlier-onset eclampsia[11]. The pathophysiology of postpartum eclampsia may be different from that of eclampsia in the antepartum period.

The pathophysiology of reversible posterior encephalopathy syndrome probably involves focal breakdown of the blood brain barrier, with a loss of fluid from the intravascular compartment[14]. In addition, many cases associated with immunosuppressive agents also have evidence of at least episodic hypertension, perhaps facilitating the diffusion of cyclosporine into brain parenchyma, where it may induce neuronal apoptosis or oligodendrocyte death[15]. In regards to the imaging findings of RPES, the head computer tomography (CT) usually is negative in the early stage. However, in our case, the brain CT revealed diffuse brain swelling, which may reflex the severity of her disease status. In the advanced stage, usually bilateral white matter edema in the posterior regions of the cerebral hemispheres is noted. In the recent decades, head magnetic resonance imaging (MRI) showed many characteristics of this syndrome[16]. The underlying pathophysiology can be demonstrated by special MR spectrum. Under the head MRI, RPES usually shows high signal-intensity lesions on FLAIR (fluid-attenuated inversion recovery) images, predominantly localized in (but not limited to) the subcortical white matter (mainly association fibers) of bilateral occipital and parietal lobes. On DWI (diffusion weighted imaging), focal lesions of subtle bright signal-intensity lesions not enough to call acute infarct support the hypothesis of vasogenic edema of brain tissue[16]. The concurrent increased appearant diffusion coefficient (ADC) value over the lesion site also proves this theory[16].

In this case, the initial differential diagnoses were very important for the further treatment. Under the impression of sudden onset seizure with conscious changes and anisocoric pupils, an acute cortical lesion with concurrent brain stem involvement was suspected. Because of the acute clinical course, cerebral infarct, cerebral venous sinus thrombosis, subarachoid hemorrhage and central nervous system infection should be taken into consideration. In such case with postpartum seizure, cerebral venous sinus thrombosis and postpartum eclampsia must be excluded firstly. Emergent head MRI was indicated to clarify all these etiologies. However, because of the post-ictal agitated status of the patient, the standard protocol of head MRI (including T1 weighted image, T2 weighted image, FLAIR, DWI, apparent diffusion coefficient-ADC, and magnetic resonance arteriography-MRA) was not completed. Only FLAIR, DWI, and magnetic resonance venography (MRV), which are critical for identifying acute brain damage and for making differential diagnosis, were performed in the first head MRI study. Because cerebral venous sinus thrombosis was an important differential diagnosis in postpartum woman with seizure, head MRV, which is not included in the routine head MRI protocol, was also performed emergently in this case.

Even the 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 outcome of the most cases of RPES will be good, like our patient; the patient can usually have a complete recovery without detectable neurological sequelae 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[17]. In our case, phenytoin was used for seizure control before the final diagnosis was achieved. However, if the diagnosis of late postpartum eclampsia was established early enough, only intravenous magnesium sulfate ($MgSO_4$) therapy was needed for seizure control in late postpartum eclampsia, instead of conventional anticonvulsants[13].

In conclusion, the rare presentation of late postpartum eclampsia as reversible posterior encephalopathy syndrome (RPES) should be taken into the list of differential diagnoses of postpartum seizure with brain stem dysfunction. The emergent head MRI is important for

identifying the etiology. Appropriate therapy for RPES can result in satisfactory prognosis before the irreversible brain damage develops.

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