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Case report

Paediatrics Section

Posterior Reversible Encephalopathy Syndrome Unmasking Acute Glomerulonephritis

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ABSTRACT

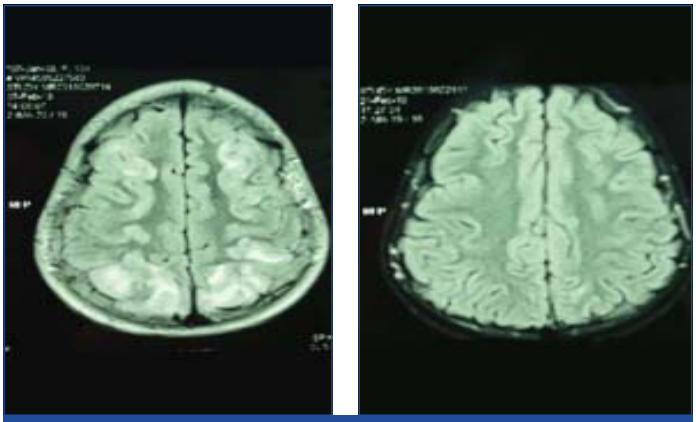
Posterior reversible encephalopathy syndrome (PRES) is a recently described condition, wherein there is vasogenic oedema, seen on neuroimaging, predominantly over the parieto occipital regions of the cerebrum. Though, as the name implies, the condition is reversible, there may be fatalities and neurological sequelae. We are reporting a 9-year-old female child in whom the typical clinical and neurological findings of PRES were caused by an atypical presentation of acute glomerulonephritis.

Keywords: Posterior reversible encephalopathy syndrome (PRES), Vasogenic oedema, Acute glomerulonephritis

CASE REPORT

A 9-year-old girl presented with an acute history of headache, vomiting, abdominal pain, right focal seizures with secondary generalization and altered sensorium. There was a history of fever for a day, at the onset of symptoms. Seizures were focal, involving the right upper limb and angle of the mouth. She had not experienced any visual aura/ hallucination or any other visual problem. On admission, she was found to be drowsy and afebrile, with a blood pressure of 180/140 mmHg. There were no meningeal signs or neurological deficits. Rest of the examination was essentially normal, except for a few papular lesions over her arms and legs, which were ostensibly caused by insect bite allergy. There was no history of oliguria, haematuria or oedema, which proved to be a red herring, and the child was managed as a case of viral meningoencephalitis with raised intracranial tension. She was treated with anti oedema measures, anticonvulsants and supportive measures. The child regained normal sensorium within 12 hours of admission, though the hypertension persisted.

At this point, an MRI brain was done [Table/Fig-1] and it revealed extensive vasogenic oedema involving the parietal, occipital, frontal and temporal areas of the cerebrum. These findings were suggestive of PRES and so, the child was evaluated for hypertension. On probing, we obtained a history of a secondary infection on the skin lesions, two weeks prior to her presentation. Urine microscopy revealed microscopic haematuria and serum C3 levels were significantly low (10 mg/dl, normal range 90 – 180), though ASLO was normal. Platelet count and peripheral smears were normal. We also did a lupus work up (ANA, DsDNA), which was negative. Renal artery Doppler, VMA levels and ESR were normal. CSF analysis was not done.



[Table/Fig-1]: MRI brain (T1images) showing hyper intense signals suggestive of extensive vasogenic oedema over the occipital, parietal and frontal regions. **[Table/Fig-2]:** MRI taken after two weeks – showing complete resolution of oedema.

The hypertension resolved within 2 days of starting oral nifedipine and frusemide. A repeat MRI which was done after two weeks, [Table/Fig-2] showed a complete resolution of the oedema. At discharge, the child was off anti hypertensives and she was symptom free. C3 levels normalized after four weeks, further validating the diagnosis of post infectious glomerulonephritis.

DISCUSSION

Posterior reversible encephalopathy syndrome (PRES) has been associated with a typical pattern of vasogenic oedema, which involving the white matter and is seen mainly in the parieto occipital areas of the cerebrum. It had been originally described in association with ecclampsia and immunosuppressive therapy. Though this condition has been described earlier under other names, Hinchey et al renamed it as PRES [1].

The pathogenesis is still an area of debate, with two diametrically opposite hypotheses. The newer and currently accepted one suggests that when the auto regulatory limit of the blood vessels in the brain are exceeded, as in severe hypertension, then the blood brain barrier breaks down, leading to vasogenic oedema [2,3]. In this case, the significantly high blood pressure (>99th percentile) may have contributed to the extensive vasogenic oedema, which in itself is a poor prognostic sign [4]. The reason for the unique predilection of the oedema for the posterior parts of the brain has been explained by an increased density of sympathetic neurons in the Posterior Cerebral Artery territory, which could explain the vicious spiral of vasospasm, hypoperfusion and oedema which are triggered by an endothelial injury [5,6].

In about one third of cases, blood pressure is normal at the onset of symptoms or it may be only minimally elevated. In the remaining cases, blood pressure is elevated, though it may not necessarily exceed the auto regulatory limits. The role of hypertension in the pathogenesis of PRES has still not been clearly elucidated, but cerebral hypo perfusion and endothelial injury seem to be the main reasons for this causation.

In children, various conditions have been associated with PRES namely post streptococcal glomerulonephritis [7,8], lupus nephritis, pheochromocytoma [9], Takayasu arteritis, polyarteritis nodosa, lympho reticular malignancies, post transplant setting, nephrotic syndrome [10], end stage renal disease [11], drugs (corticosteroids, cyclophosphamide, tacrolimus, cyclosporine, rituximab etc.) and also in the setting of immunosuppression.

The child who has been reported here, presented with severe hypertension without oedema, oliguria or gross haematuria. Furthermore, the onset was with fever, which seemed to indicate an infective or inflammatory pathology, although fever has been described as a presenting manifestation in hypertensive encephalopathy. It was only because of the skin findings, laboratory evidence of microscopic haematuria and low serum complement levels, that the diagnosis was clinched.

The clinical manifestations of PRES, typically, are headache, vomiting, seizures, visual disturbances and altered sensorium [12,13]. Seizures, the most consistent manifestation, are usually generalized and tonic clonic in nature, though focal seizures have also been described. This child presented with status epilepticus i.e. multiple episodes of focal seizures, with a secondary generalization, and with no recovery of sensorium in the intervening period.

Three specific neuroimaging patterns are seen in PRES – the holohemispheric watershed pattern, as was seen in our case, the superior frontal sulcus pattern and the parieto occipital pattern [14]. The T2 weighted MRI images show diffuse, symmetric and reversible hyper intensities which mainly involve the white matter, but rarely the grey matter. The diagnostic features which are seen on MRI are oedema of the subcortical white matter on T2 weighted and FLAIR images. White matter is more susceptible to vasogenic oedema as compared to the densely packed cortex [15]. Basal ganglia, brain stem and cerebellum can also be involved.

Management of PRES is based on the broad principles of control of hypertension, seizure control and withdrawal of inciting agent. Central to the management of PRES, in cases with hypertension, is treatment of the elevated blood pressure. This is very important, because PRES is not spontaneously reversible and any delay in the diagnosis and management can lead to permanent sequelae. Sequelae, especially in children, may range from visual defects to epilepsy to cognitive decline. It has been recommended that BP may be brought down to pre morbid levels, though not rapidly, with intravenous anti hypertensives [16]. In this case, oral nifedipine and intravenous frusemide effectively controlled the hypertension.

The outcome in this case was very good, because the predisposing condition was acute nephritis, which in itself, is a reversible one. Also, the condition was diagnosed early and no associated poor prognostic features like haemorrhage or infarction were seen on MRI. Despite the extensive areas of oedema which were seen on MRI, a complete resolution was noted within two weeks.

In conclusion, PRES should be suspected in all children who present with altered sensorium and seizures with or without hypertension, especially considering the frequency with which new associations of PRES are being reported. Irrespective of the aetiology, an early recognition and prompt management significantly reduce mortality and long term complications.

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