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Case Report

Posterior Reversible Encephalopathy Syndrome in the Emergency Department: A Case Report

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Abstract

Posterior reversible encephalopathy syndrome (PRES) is a rare condition characterized by cerebral distress and typical radiological images. Here, we report a case of a 20-year-old male, a chronic renal failure patient on hemodialysis, who presented with status epilepticus accompanied by elevated blood pressure. MRI revealed parieto-occipital lesions with T2 hypersignal. The patient responded well to antiepileptic and antihypertensive treatment, with complete recovery of consciousness and hemodynamic stabilization. The aim of this case is to highlight the importance of considering PRES in suggestive circumstances, given the favorable outcomes observed in early-treated patients.

Keywords: *Posterior Reversible Encephalopathy Syndrome; Arterial Hypertension; Status Epilepticus; Magnetic Resonance Imaging*

Introduction

Posterior reversible encephalopathy syndrome (PRES) is a clinical and radiological entity characterized by a variable combination of seizures, altered mental status, headaches, visual disturbances, nausea, vomiting, and focal neurological deficits, along with typical brain imaging findings (MRI or CT scan). These manifestations can be severe and life-threatening when presenting as coma or status epilepticus. The etiologies associated with PRES are diverse, with toxic exposure and acute hypertensive crisis being prominent factors. It predominantly affects young patients, mostly females, with significant comorbidities such as solid organ transplantation, chronic renal failure, or arterial hypertension. The understanding of the pathophysiology of this syndrome remains controversial. We present the case of a young man who developed PRES following an acute hypertensive crisis.

Case Presentation

The patient (A.K) is a 20-year-old right-handed male, followed for end-stage chronic renal failure on hemodialysis for 3 years, taking Amlodipine for hypertension, and a regular tobacco and cannabis user. He presented to the emergency department of Ibn Rochd University Hospital with status epilepticus, characterized by recurrent convulsive seizures lasting more than 5 minutes, without regaining consciousness between seizures. The patient reported unusual headaches following the last hemodialysis session, followed by a progressive alteration of consciousness preceding the status epilepticus, without visual disturbances, vomiting, or fever. The seizures ceased after the administration of 10 mg of Midazolam. The post-seizure examination revealed a fully conscious patient with symmetrical and reactive pupils, without sensory or motor deficits. On respiratory examination, the patient had a respiratory rate of 17 breaths per minute, oxygen saturation of 95% in room air, normal pleuropulmonary auscultation, and no signs of respiratory distress or cyanosis. Hemodynamically, the

patient had a heart rate of 86 bpm, blood pressure of 18/12, a capillary glucose level of 0.9 g/L, and a normal cardiac auscultation without pallor or abnormal heart sounds. The rest of the somatic examination was unremarkable. The patient experienced a recurrent seizure 40 minutes after admission and received a loading dose of Phenobarbital (15 mg/kg). During hospitalization, the patient was treated with Nicardipine and underwent a CT scan, brain MRI, lumbar puncture, EEG, complete blood workup, urinalysis, ECG, transthoracic echocardiography (TTE), and chest X-ray. The CT scan showed no significant abnormalities (Figure 1), but the MRI revealed bilateral parieto-occipital lesions with T2 hypersignal, consistent with posterior reversible encephalopathy syndrome (Figure 2).

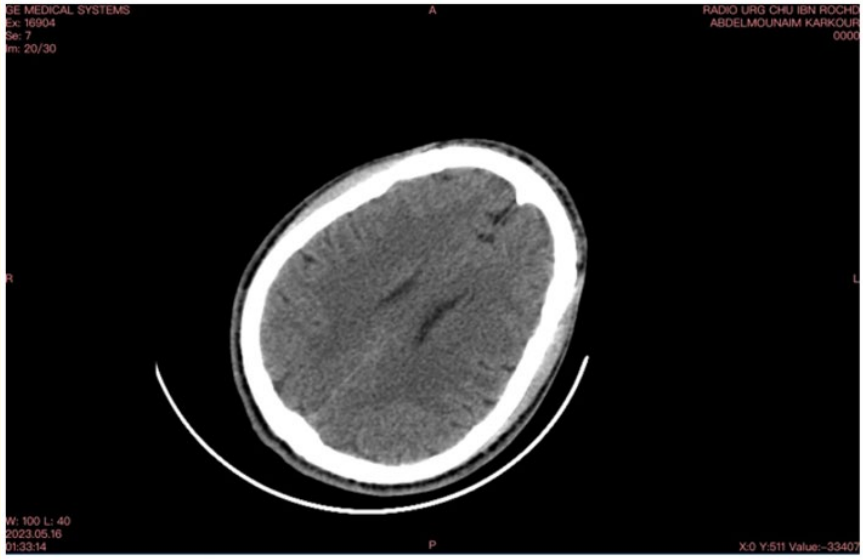

Figure 1: *CT scan showing no abnormalities.*

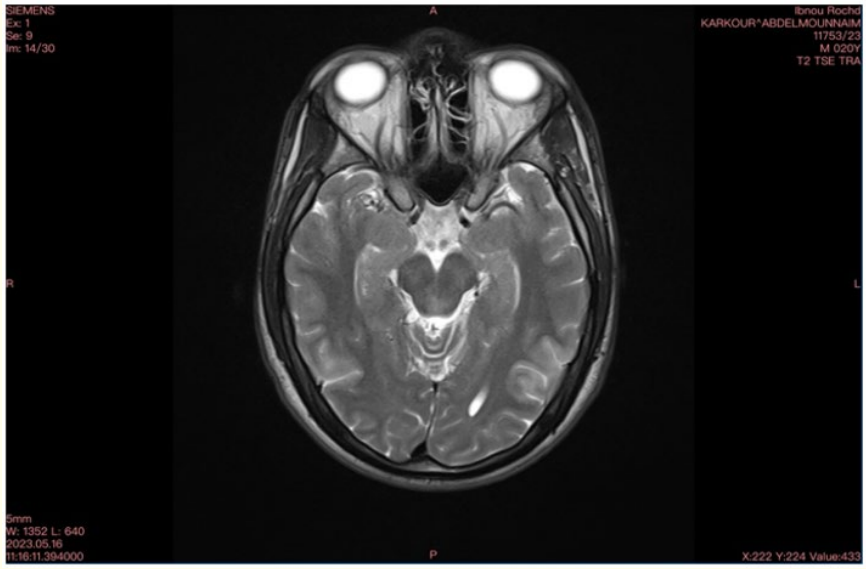

Figure 2: *MRI showing bilateral parieto-occipital lesions with T2 hypersignal.*

Lumbar puncture results were normal, ruling out infectious causes. EEG showed some slow waves discharges on a normal basal rhythm. Complete blood workup, including renal function tests, liver function tests, and electrolyte levels, was within normal limits. Urinalysis did not reveal any abnormalities. ECG showed sinus rhythm without ST-T wave changes. Transthoracic echocardiography revealed normal cardiac structure and function. Chest X-ray was unremarkable.

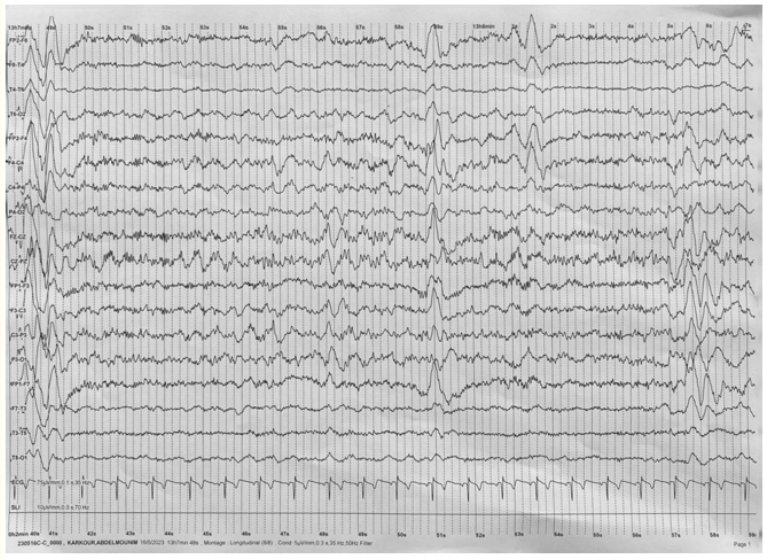

Figure 3: *EEG showing some slow waves discharges on a normal basal rhythm.*

Based on the clinical presentation, imaging findings, and exclusion of other causes, a diagnosis of posterior reversible encephalopathy syndrome (PRES) was made. The patient was started on antiepileptic therapy with levetiracetam and antihypertensive therapy with amlodipine to control blood pressure. Hemodialysis sessions were continued as scheduled. Evolution was positive after treatment of the triggering factor, and the patient was transferred to the nephrology department for additional medical care.

Discussion

Posterior reversible encephalopathy syndrome (PRES) is a rare clinical and radiological syndrome, often under-diagnosed, first described by Hinchey., *et al*. in 1966 after a series of 15 cases, characterized by neurological symptoms such as seizures, altered mental status, headaches, and visual disturbances, along with typical radiological findings of reversible vasogenic edema predominantly affecting the posterior regions of the brain. The exact pathophysiology of PRES is not fully understood, but it is believed to involve endothelial dysfunction and disruption of the blood-brain barrier, leading to vasogenic edema [1].

Risk factors

The most commonly identified risk factors for PRES include hypertension, renal failure, immunosuppressive therapy, autoimmune disorders, and certain medications (ex: cyclophosphamide) In this case, the patient had chronic renal failure and was on hemodialysis. The acute hypertensive crisis likely played a significant role in the development of PRES. The use of amlodipine, a calcium channel blocker, may have contributed to the blood pressure fluctuations [1].

Clinical presentation

Clinical manifestations of PRES can be very variable but consist mainly of: headaches, seizures, visual disturbances and alteration of consciousness. Most often they are associated with acute hypertension [2]. This is in line with our case as the patient presented to the emergency department in status epilepticus.

Differential diagnoses

The key differential diagnoses include ischemic stroke, intracranial hemorrhage, and infectious encephalitis, which can be ruled out by appropriate investigations.

Radiological presentation

Reversible posterior encephalopathy syndrome (PRES) is radiologically characterized by abnormalities in the white matter and gray matter, predominantly affecting the posterior regions, suggesting edema in the posterior parieto-occipital regions of the brain. Imaging is essential and should be performed promptly to enable early diagnosis for initiating appropriate treatment and limiting the risk of irreversible damage.

Computed tomography (CT) often shows abnormalities with diffuse posterior hypodensities that do not enhance with contrast. During the initial phase, CT is not a reliable diagnostic tool because in the absence of hemorrhagic or ischemic complications in the brain parenchyma, it may falsely appear normal in 40% of cases [3]. The CT scan of our patient showed no abnormalities.

Magnetic resonance imaging (MRI) is often characteristic and aids in making the diagnosis in a clinically suggestive context, but it can also be normal. Although brain CT can detect PRES lesions, MRI is considered the gold standard imaging modality. The lesions typically appear as iso-signal or hypo-signal on T1-weighted images and hyper-signal on T2-weighted and FLAIR images. There is usually no enhancement after contrast agent administration [3]. This concords with the MRI results of our patient.

Biological investigations

Usual biological investigations are not necessary to retain the diagnostic of PRES but can contribute to exclude differential diagnoses: Lumbar puncture is systematic to eliminate a subarachnoid hemorrhage if the CT scan is normal. Blood workup is usually normal.

Other investigations

EEG is most often normal and can sometimes show some slow waves, with little to no responsiveness, without any focal neurological. Consistently in our case the EEG showed some slow waves discharges on a normal basal rhythm.

Management

The management of PRES involves addressing the underlying cause, controlling blood pressure, and managing seizures if present [4]. Antihypertensive agents, such as calcium channel blockers and intravenous antihypertensive drugs, are commonly used to achieve blood pressure control. Antiepileptic medications, such as levetiracetam or phenytoin, are administered for seizure management. With prompt and appropriate treatment, most patients with PRES experience complete resolution of symptoms and radiological findings [5].

Prognosis

The prognosis of PRES is mainly determined by the underlying condition, since the neurological manifestations are reversible in the majority of patients. However, since PRES is often accompanied by severe complications, neurological sequelae may persist. Singer and colleagues observed a complete resolution of neurological signs and symptoms in 84% of cancer patients with PRES [6]. In our case, the patient has fully recovered without any neurological sequelae and has been able to resume his normal life.

Conclusion

Posterior reversible encephalopathy syndrome is a rare but important clinical entity that should be considered in patients presenting with seizures, altered mental status, and characteristic neuroimaging findings. Prompt recognition and management of this condition, including blood pressure control and seizure management, can lead to favorable outcomes. Clinicians should be aware of the risk factors and typical clinical features of PRES to ensure early diagnosis and appropriate treatment.

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