CASE REPORT

THE PATIENT
55-year-old woman

SIGNS & SYMPTOMS
– Bifrontal headache
– Blurred vision
– Vomiting

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THE CASE

A 55-year-old woman presented to the emergency department (ED) with a bifrontal headache that she'd had for one day. She also had blurred vision and was vomiting shortly before coming to the hospital. The patient had no history of hypertension, migraine headaches, seizure disorder, autoimmune disorders, or cerebrovascular disease.

Her vital signs, including a blood pressure of 114/63 mm Hg, were normal, but a physical examination revealed subjective vision loss. She was only able to see objects moving on a horizontal plane. Her finger-to-nose exam, pupillary reflexes, and extra-ocular movements were normal, but peripheral vision was limited on her left side. No other neurologic deficits were noted.

The patient was admitted to the hospital and most of her laboratory work-up was normal, including a basic metabolic panel, complete blood count, coagulation studies, brain natriuretic peptide test, and cardiac enzymes. Her white blood cell count was 19,700/mcL, but no source of infection was found. A computed tomography (CT) scan of her head without contrast showed low-density, patchy areas in the subcortical regions of the parietal and occipital lobes bilaterally (**FIGURE 1**, arrows), with relative sparing of the cortex.

THE DIAGNOSIS

Based on our patient's presentation and radiologic findings, we made a diagnosis of posterior reversible encephalopathy syndrome (PRES). However, because we could not rule out an ischemic cerebrovascular event at the time of presentation, we started the patient on aspirin and clopidogrel 75 mg to prevent possible future ischemic events. The next day, we ordered magnetic resonance imaging (MRI) of the head and neck, which documented the edema and confirmed the diagnosis of PRES (**FIGURE 2**).

DISCUSSION

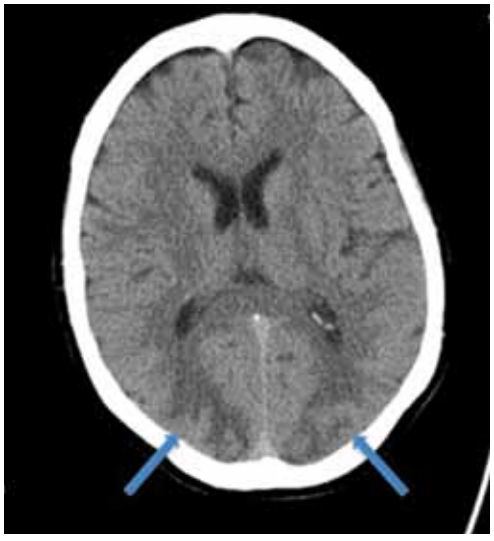
PRES is a neurotoxic state associated with a unique pattern of brain vasogenic edema seen on CT or MRI. The edema is often widespread but is predominantly found in the parietal and occipital regions.[1] PRES is seen in patients with a variety of conditions, including hypertension and bone marrow or organ transplantation, as well as in those receiving immunosuppressive or cytotoxic medications.[1] Patients with PRES typically present with headaches and seizures.[2] Visual abnormalities (most commonly cortical blindness), occur in 15% to 20% of patients with PRES.[2-4]

Hinchey et al[3] first described reversible posterior leukoencephalopathy syndrome (which later became known as PRES) in 1996. Most of the 15 patients included in this original report had a history of hypertension or immunosuppression. These cases were associated with cerebral edema in portions of the posterior cerebral white matter. It is thought that hypertension alters the blood-brain barrier and causes the acute changes that occur in PRES.[3]

Besides hypertension and immunosuppression, the risk factors most commonly as-

FIGURE 1

CT reveals vasogenic edema



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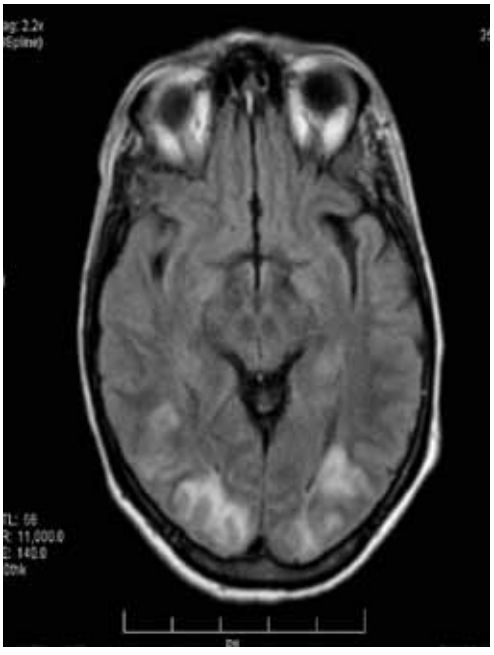
A noncontrast CT of the patient's head showed decreased attenuation in the subcortical regions of the parietal and occipital lobes bilaterally (arrows), with relative sparing of the cortex.

FIGURE 2

MRI clinched the Dx



MRI of the brain without contrast (FLAIR sequence) confirmed posterior vasogenic edema in the subcortical white matter of the parietal and occipital lobes with a predilection for the watershed territories, typical of posterior reversible encephalopathy syndrome.

sociated with PRES include preeclampsia/eclampsia; sepsis, particularly due to gram-positive organisms; Wegener's granulomatosis, scleroderma, and polyarteritis nodosa; cancer chemotherapy; bone marrow or stem cell transplantation; and renal disease.[1,4-6]

Although a clear cause of PRES has not yet been established, researchers have proposed 2 theories. The first postulates that a sudden increase in systemic blood pressure causes vasoconstriction, which leads to ischemia and edema.[1-4,7,8] However, several studies have also described cases of PRES in patients with mild elevations in blood pressure,[1,5-7] and mild edema has been observed even in normotensive patients[1,5] (as was the case with our patient).

The second theory links PRES to the loss of brain autoregulation, a function that maintains steady blood flow when blood pressure fluctuates.[6] A loss of this regulatory mechanism causes endothelial dysfunction, capillary leakage, and disruption in the blood-brain barrier.[1,2,4,6-8] These changes then lead to cerebral vasodilatation and edema.[2] Immunotherapy has also been associated with increased endothelial dysfunction.[2]

The evidence on the link between the severity of PRES and clinical outcomes is conflicting.

One study that followed 113 PRES patients over 6 years did not find an association between the severity of clinical presentation and the extent of vasogenic edema found on imaging studies.[5] Of these 113 patients, 69 had PRES primarily due to hypertension, and 21 were receiving cytotoxic medications.[5] In contrast, a larger retrospective study that followed patients with PRES for 12 years found that severe cases, which included patients with severe cerebral edema and altered mental status, had poor outcomes.[4] Small studies have reported that 14% of patients with PRES develop cerebral hemorrhage.[8]

When to suspect this condition. PRES should be part of the differential diagnosis for any patient who presents with headache and vision loss. It is important to distinguish PRES from an acute cerebrovascular accident (CVA) because the 2 conditions are managed differ-

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PRES lesions can be misdiagnosed as tumors—especially in patients with a history of malignant disease who have undergone chemotherapy.

ently.[2] In addition, PRES lesions can be misdiagnosed as tumors, especially in a patient with a history of malignant disease in whom the condition appears after chemotherapy.[9]

Treatment targets the underlying causes

Treatment options for PRES are limited. Hypertension in a patient with PRES requires prompt intervention to avoid progression of the disease.[2] The use of intravenous (IV) calcium-channel blockers or IV beta-blockers for these patients is common.[2,8]

Patients with seizures should be treated with anticonvulsant medication, but long-term antiepileptic treatment usually is not required.[2] Patients who take immunosuppressant or cytotoxic drugs should stop them indefinitely upon presenting with PRES.[2]

For a pregnant woman with preeclampsia/eclampsia, delivery of the placenta, which is considered to be the cause of PRES in these cases, is curative.[1] However, women can develop PRES several weeks after delivery.[1]

In most cases, the symptoms associated with PRES will resolve once treatment is initiated, and neurologic recovery can be expected within 2 weeks.[2]

Our patient regained her sight the following morning and was discharged home 2 days after admission. Her blood pressure remained normal. She returned to the hospital unresponsive the day after she had been discharged. Family members stated that she had taken 15 packets of an aspirin/caffeine combination to control a new headache.

Her blood pressure was elevated at 159/79 mm Hg. A CT of the brain showed a hemorrhagic stroke within the left occipital lobe and posterior parietal lobe with a midline shift of 8 mm. We don't know if the aspirin use contributed to the hemorrhagic event or if it was a sequela of PRES.

The patient died 4 days later.

THE TAKEAWAY

PRES is a neurotoxic condition that causes headache, seizures, and vision loss. Most patients will present with elevated blood pressure and imaging studies will reveal a specific pattern of vasogenic edema that is predominately found in the parietal and occipital regions.

Treating the hypertension may result in a more favorable recovery. Normotensive patients are harder to treat because there is no specific therapy for PRES. Follow-up imaging may help to assess the resolution of the syndrome. **JFP**

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