

## Posterior Reversible Encephalopathy Syndrome (PRES)

A 42-year-old male with past medical history of hypertension and hyperlipidemia presents to the emergency department via emergency medical services (EMS) for episodes of staring, confusion, and left-sided weakness. The patient was at work when a coworker found him acting strangely and called EMS. He takes atorvastatin and lisinopril at home. Family members report no history of previous strokes or myocardial infarctions. He takes his medications as prescribed. Upon arrival to the emergency department his vitals were reported as:

Temp: 99.2 F

HR: 82 beats/min.

BP: 182/96 mmHg

RR: 16 breaths/min.

O2 Sat: 96%

He is oriented to person but not to place or time. His NIH stroke score is 2 with left lower leg weakness and left lower leg sensory loss. Cardiac and pulmonary exam are normal. CT and MRI of the brain are ordered. Images are shown to the right (Figure 1). What is the most likely underlying pathology?

- a) Acute thrombotic event
- b) Infectious process
- c) Vasoconstriction
- d) Acute rupture of blood vessel in subarachnoid space
- e) Vasogenic edema

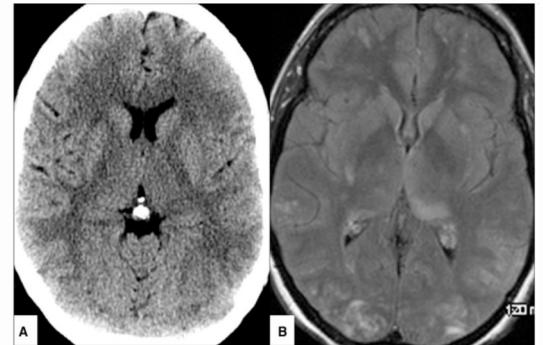


Figure 1. (a) CT and (b) MRI brain with disease process of parieto-occipital brain.<sup>1</sup>

### Laboratory Results

Na: 137

K: 3.8

Cl: 100

Bicarb: 24

Mg: 1.2

Glucose: 144

BUN: 21

Cr: 1.1

RBC: 440k

WBC: 8k

D-dimer: 0.1

## Discussion

- Acute thrombotic event – Describes stroke. Although patient presents with left lower extremity weakness and left lower extremity loss of sensation, his CT brain is not indicative of a thrombotic event.
- Infectious process – Patient presents with no fever or leukocytosis. Patient presentation of acute process would be rare for an infectious process.
- Vasoconstriction – This describes reversible cerebral vasoconstriction syndrome that usually presents with sudden headache.
- Acute rupture of blood vessel in subarachnoid space – No blood noted in subarachnoid space on CT.
- Vasogenic edema – CORRECT, hypertension leads to increased pressure in the blood vessels causing edema.**

Posterior reversible encephalopathy syndrome (PRES) is a neurological disorder of acute/subacute onset characterized by various symptoms such as headache, impaired visual acuity/visual fields, altered mental status, seizures, and focal neurological deficits.<sup>2</sup>

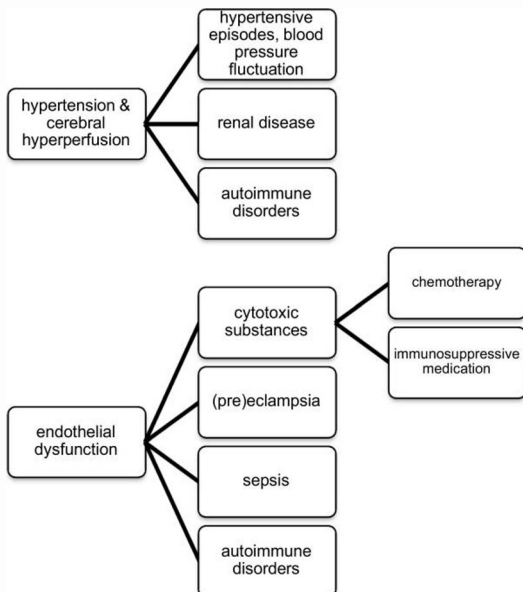


Figure 2. Risk factors and leading hypothesis that predispose an individual to develop PRES.<sup>2</sup>

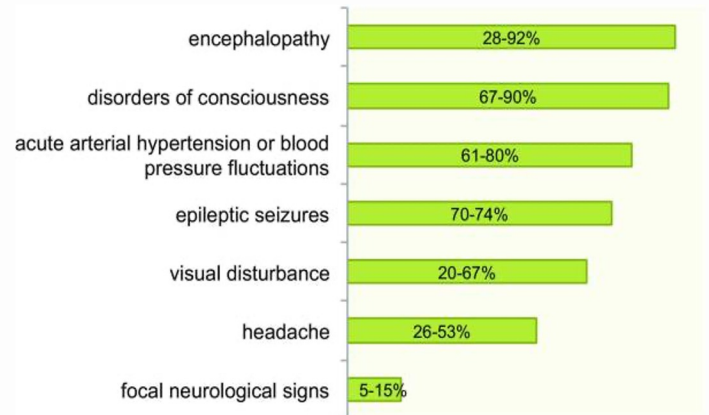


Figure 3. incidence of symptoms in patients presenting with PRES.<sup>2</sup>

### Diagnostic workup of PRES<sup>3</sup>

- Head CT and MRI (gold standard)
- CBC
- BMP
- Albumin levels
- Glucose levels
- Possible lumbar puncture
- EEG

## Treatment

Treat based upon symptomatology:

- Hypertension – Decrease blood pressure by 25% from baseline.
- Seizures – Antiepileptic medications; no guideline on specific drugs or duration.
- Inciting drugs – Review medications, assess therapeutic range, consider reducing or discontinuing.
- Hypomagnesemia – Replete magnesium levels to normal-high range.

## Key Imaging Findings

The major tool needed to identify PRES is neurological imaging. CT imaging is commonly used with MRI being the gold standard. Multiple patterns of PRES syndrome have been defined as shown below (Figure 4).

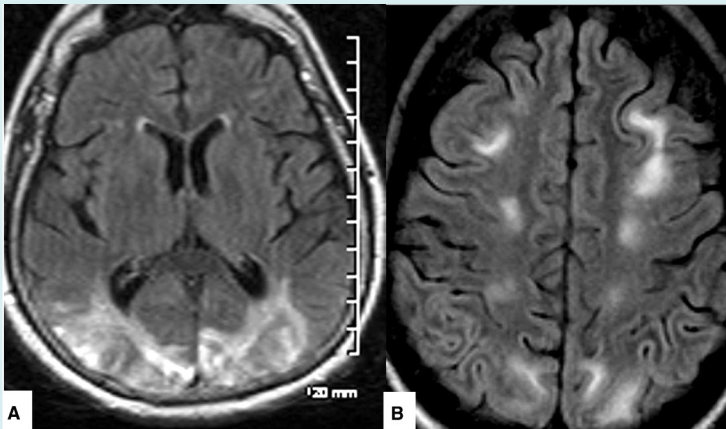


Figure 4. MRI showing common findings in PRES: (a) classic parietal-occipital pattern; (b) superior frontal sulcus pattern.<sup>1</sup>

## Take Home Points

- **The presentation of PRES is highly variable and can be difficult to distinguish from a stroke.**
- **Most common clinical presentations include encephalopathy, fluctuating levels of consciousness, and acute blood pressure fluctuations.**
- **Two leading theories of pathophysiology, cerebral hyperperfusion versus endothelial toxicity.**
- **Classic presentation of PRES found on neuroimaging shows parieto-occipital vasogenic edema.**
- **No specific treatment - based on symptomatology and underlying etiology.**

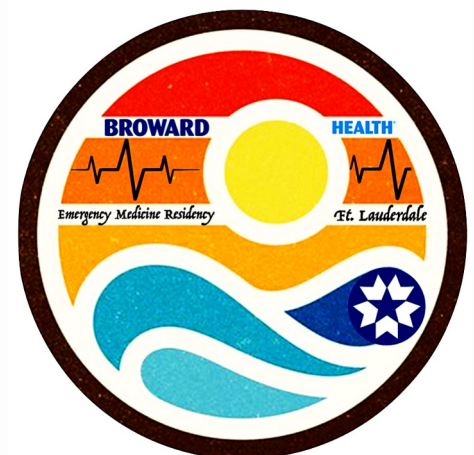


### About the Author

Collin Goldstein is a fourth-year medical student at FIU HWC. He will graduate May 2023 and is applying for residency positions in Anesthesiology.

### References

1. Shankar, J., & Banfield, J. (2017). Posterior Reversible Encephalopathy Syndrome: A Review. *Canadian Association of Radiologists journal = Journal l'Association canadienne des radiologistes*, 68(2), 147–153. <https://doi.org/10.1016/j.carj.2016.08.005>
2. Fischer, M., & Schmutzhard, E. (2017). Posterior reversible encephalopathy syndrome. *Journal of neurology*, 264(8), 1608–1616. <https://doi.org/10.1007/s00415-016-8377-8>
3. Zelaya, J. E., & Al-Khoury, L. (2022). Posterior Reversible Encephalopathy Syndrome. In *StatPearls*. StatPearls Publishing.



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