

# EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER  
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

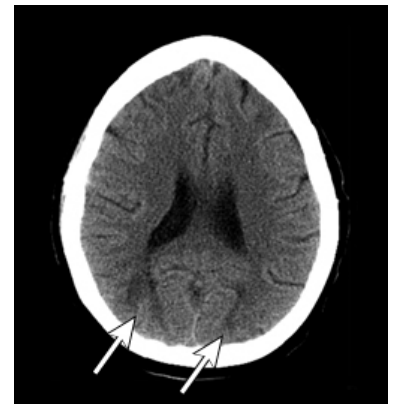
Author: Mortatha Al-Bassam | Editor: Samir Hussain, M.D.

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## Posterior Reversible Encephalopathic Syndrome

65 y/o F with a h/o ovarian cancer, currently on chemotherapy brought into the ED by her husband due to altered mental status. He says that she went to bed last night at 7 with to a headache, and woke up several times throughout the night to take ibuprofen, with no relief. On exam, temperature is 98 F, HR 106, RR 18 br/min, and BP 217/119. She is unable to follow commands, and expresses frustration in searching for the right word when trying to speak. When she does speak, her language is unintelligible. Neurological exam is otherwise unremarkable. CT angiogram shows no signs of stenosis. CT head w/o contrast shows hypodensity in the posterior circulation indicating edema. What is your next step?

- A. Contact the pharmacist to begin tissue plasminogen activator
- B. Toxicology screen
- C. Order an MRI of the brain
- D. Consult neurosurgery
- E. Nicardipine drip



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CT scan showing hypodensity  
in posterior circulation

PRES is a clinical and radiologic syndrome consisting of neurological symptoms coupled with vasogenic edema on cerebral imaging

*EM Case of the Week is a weekly "pop quiz" for ED staff.*

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

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Department of Emergency Medicine  
1625 SE 3rd Avenue  
Fort Lauderdale, FL 33316

The answer is E. TPA is contraindicated in this patient, and there are no signs of stenosis. One should not wait for the toxicology screen or an MRI before addressing the patient's blood pressure. Cerebral edema without trauma is not an indication for consulting neurosurgery. Address the vitals first and foremost in this case, they should be treated with a nicardipine continuous infusion.

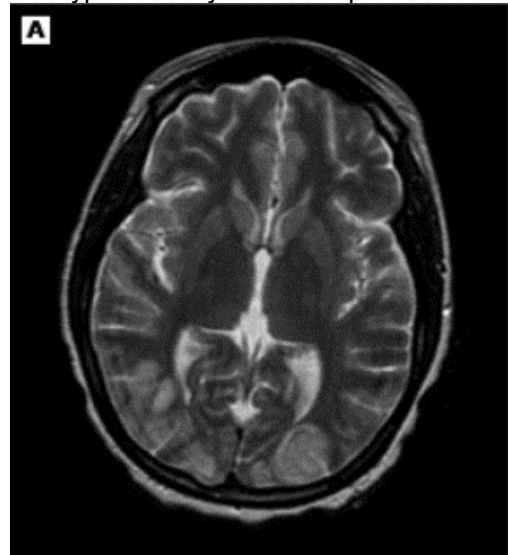
## Discussion

Posterior reversible encephalopathic syndrome is a neurologic syndrome that refers to the neuroimaging findings of vasogenic edema particularly in the posterior circulation in conjunction with symptoms of altered mental status, seizure headache, confusion, and/or visual changes. The name is misleading as not all cases are reversible, making prompt recognition and diagnosis critical. The syndrome has been diagnosed alongside a number of medical conditions including hypertensive encephalopathy, eclampsia, and along with the use of cytotoxic and immunosuppressant drugs. Cases have been reported in patients as young as two years old and as old as 90. It is more common in women even when cases of eclampsia are excluded.

While the pathophysiology is unclear. Several mechanisms have been postulated.

**Auto regulatory failure:** Normal auto regulation maintains constant cerebral perfusion over a range of systemic blood pressures through arteriolar constriction and vasodilation. However, in cases where there is a rapid rate of blood pressure elevation and the upper limit of cerebral autoregulation is exceeded, the arterioles dilate and cerebral blood flow increases thereby leading to the breakdown of the blood brain barrier and allowing extravasation of fluid into the brain parenchyma.

Figure A: this shows a T2 weighted MRI with hyperintensity in the occipital lobes.



**Cerebral Ischemia:** In many cases of this syndrome, neuroimaging will show increased rather than decreased perfusion. However, disordered auto regulation can lead focal vasoconstriction. Furthermore, the vasogenic edema can cause compression of the microcirculation.

**Endothelial dysfunction:** In cases of preeclampsia or cytotoxic therapies, damage to the endothelium may lead to capillary leakage, disruption of the blood brain barrier, and in these cases, PRES can result in normotensive individuals and at non-toxic levels of the drug. Markers of endothelial cell dysfunction maybe used in preeclampsia as they correlate better with the extent of edema, better than blood pressure changes. This includes lactate dehydrogenase, abnormal red blood cell morphology; more specific markers including fibronectin, tissue plasminogen activator, endothelin-1, and von Willebrand factor.

For a list of educational lectures, grand rounds, workshops, and didactics please visit [BrowardER.com](http://BrowardER.com) and **click** on the **"Conference"** link.

*All are welcome to attend!*

# Warriors

## Treatment

- Lower the diastolic pressure to approximately 110-105 within two to six hours with the maximum initial fall not exceeding 25% of the presenting value.
- In cases with less severe hypertension - lower the mean arterial pressure in 10-25% increments until the patient's own target pressure is reached.
- Medication options: titratable agents such as clevidipine, nicardipine, labetalol, and nitroprusside. Nitroprusside could theoretically increase vasodilation, and so should be used as a last resort.
- IV boluses of antiseizure medications should be used when necessary, keeping in mind that levetiracetam and lacosamide must be adjusted for renal impairment and that some medications (phenytoin) can cause sedation. Once the episode resolves, the medication can be tapered off.

## Prognosis

Most cases of PRES are benign and reversible within a period of days to weeks after removal of the inciting factor and control of the blood pressure. Radiologic improvement lags behind clinical recovery. Death and neurologic impairments have been described. Ischemia, hemorrhage, and extensive vasogenic edema are poor prognostic indicators.

## Take home points

- Vital signs are vital. Pay attention to the blood pressure
- Review the patient's medication lists
- Neurological impairment in the setting of neuroimaging that shows cerebral edema, particularly in the posterior circulation is concerning for PRES
- Prompt recognition and management is important to reduce the likelihood of permanent damage of death.



## ABOUT THE AUTHOR

This month's case was written by Mortatha Al-Bassam. Mortatha is a 4<sup>th</sup> year medical student from FIU HWCOC. He did his emergency medicine rotation at BHMC in October 2019. Mortatha plans on pursuing a career in Emergency Medicine.

## REFERENCES

Neill, T. (2019). *UpToDate*. [online] Uptodate.com. Available at: <https://www.uptodate.com/contents/reversible-posterior-leukoencephalopathy-syndrome#H17> [Accessed 18 Oct. 2019].