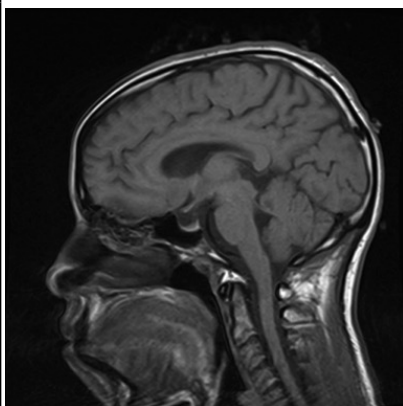
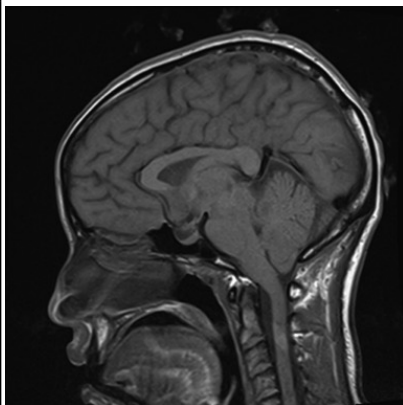


# The Monro-Kellie Doctrine in Action: Posterior Reversible Leukoencephalopathy Syndrome (PRES) Due to Intracranial Hypotension from Lumbo-peritoneal Shunt Placement

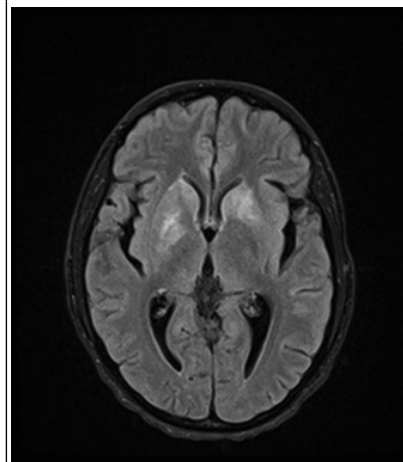
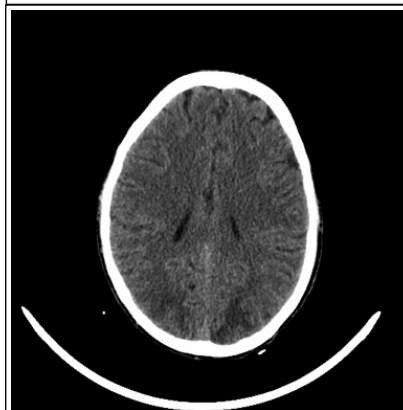
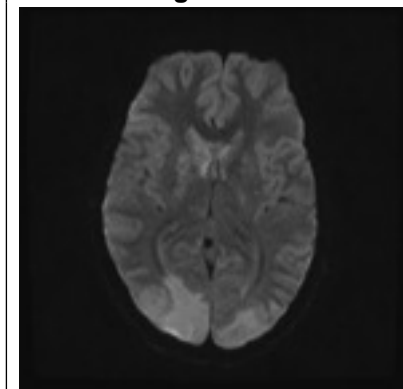
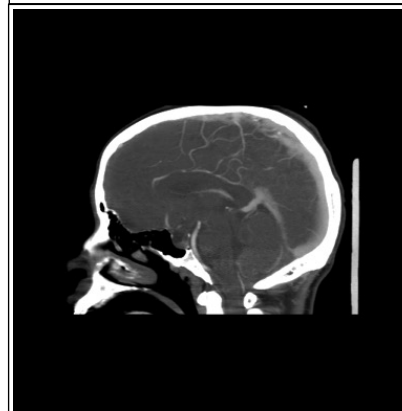
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**Introduction:** Posterior Reversible Leukoencephalopathy Syndrome (PRES) is linked to various etiologies, foremost systemic hypertension. Its association with intracranial hypotension (IH) is under-recognized. We report a case of lumboperitoneal shunt induced IH resulting in PRES and suggest a potential biological mechanism, based on the Monro-Kellie hypothesis.

**MRI Pre-Shunt**

**MRI Post-Shunt**


## Results

A 26-year-old woman with AIDS and epilepsy was admitted for recurrent cryptococcal meningitis and breakthrough seizures. There was no radiologic evidence of hydrocephalus. Due to persistently elevated symptomatic intracranial pressure, a lumboperitoneal shunt was placed. Subsequently, the patient had a breakthrough seizure and became encephalopathic, in the absence of systemic hypertension. An electroencephalogram showed diffuse theta slowing. Repeat head computed tomography (CT) showed extensive white matter hypodensities in the bilateral parieto-occipital lobes. CT venogram showed engorged venous sinuses without thrombosis. Brain MRI showed tonsillar transtentorial herniation in addition to bi-posterior PRES lesions. After programmable valve placement in series with the lumboperitoneal shunt to prevent CSF overdrainage, she experienced dramatic clinical and radiological improvement.

**Pre-shunt MRI with cryptococcal infection, but no PRES**

**Post-shunt imaging (MRI/CT) with signs of PRES**

**Venogram showing cerebral venous engorgement**


## Conclusions

IH appears to be a distinct, under-reported cause of PRES. It occurs in susceptible patients, typically 2-5 days after the IH trigger, and seems clinically and radiologically similar to the more common hypertensive cases, both in terms of initial presentation and prognosis. In accord with the Monro-Kellie doctrine stating that the sum of brain, blood, and CSF volume is constant, venous sinus engorgement associated with IH could increase the hydrostatic pressure in the brain arterioles and capillaries and result in interstitial extravasation and brain edema of PRES. Increased vigilance is required to allow for prompt recognition and management.

## Selected References

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