Reversible Posterior Leukoencephalopathy

Key points:
1) Most often caused by abrupt changes in blood pressure, seizures, or certain immunosuppressive medications.
2) Characterized by reversible changes on neuroimaging, especially in the posterior areas.
3) Treatment includes managing blood pressure, controlling seizures, and discontinuing offending agents.
4) Overall prognosis is good.

What is it?
A syndrome characterized by headache, visual changes, altered mental status, or seizures with reversible changes on neuroimaging, often occurring after rapid increases in blood pressure, seizures, or some immunosuppressive medications.

What’s happening on the micro level?
Thought to be caused by breakdown of the blood brain barrier with focal transudation of fluid and petechial hemorrhages, ultimately leading to vasogenic edema. Essentially the autoregulatory ability of vasculature to constrict and dilate is altered. This is seen more often in white matter but can occur in gray matter. The posterior cerebrum is affected more than other areas because of altered vascular reactivity.

What are the clinical symptoms?
Usually subacute onset, but may present initially with seizure. First symptoms are often decreased alertness and activity. Other symptoms include:
- Headache
- Nausea, vomiting
- Altered mental status: decreased alertness, diminished spontaneity of speech, behavioral changes, somnolence. Focal deficits usually not seen and loss of consciousness is rare.
- Seizure (can be focal or generalized)
- Abnormal visual changes: cortical blindness, homonymous hemianopsia, blurred vision

What do I see on neuroimaging?
Location of lesions if usually in occipital, parietal, and temporal areas, although cases have reported involvement of brain stem, cerebellum, basal ganglia, and frontal cerebrum.

CT scan: non-enhancing white matter with hypodensities
MRI T1 weighted images: hypointense areas
MRI T2 weighted images: hyperintense areas

What causes it?
- Hypertensive changes: usually seen in abrupt increases in blood pressure
- Immunosuppressives and other drugs: especially cyclosporine and tacrolimus, although has been reported in patients receiving chemotherapy for neoplasms. Also seen with indinivir, interferon alpha, erythropoetin therapy.
- Renal failure: lupus nephritis, acute GN, hepatorenal syndrome from tylenol toxicity
- Ecclampsia
- Other: cases reported from polyarteritis nodosa, acute intermittent porphyria
Why do immunosuppressive drugs, particularly cyclosporine and tacrolimus cause this?
Believed to be a combination of several factors do to the drugs and their metabolites causing the following:

a) perturbation of the blood brain barrier  
b) vasoconstriction due to release of endothelin  
c) microthrombi from release of prostacyclines and thromboxane A2

What should I consider in the differential?
Similar findings can be seen with bilateral infarction of posterior cerebral artery, although one would often see focal findings. Reversible posterior leukoencephalopathy also usually spares the calcarine and paramedian occipital lobe structures whereas PCA stroke does not.

What should I do about it?
1) Treat hypertension  
2) Avoid ongoing seizures  
3) Stop or reduce dosage of any offending agent

What is the prognosis?
Usually favorable. Most patients will resolve symptoms and imaging will return to normal in a few weeks (range of imaging resolution 8 days to 17 months in one study). A few patients have been reported to have hemosiderin deposits remaining in affected brain areas, but rarely are patients functionally compromised unless the underlying problem has not been addressed.

References: