Posterior Reversible Encephalopathy Syndrome: A Case of Hypercalcemia

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Objectives
- To understand the systemic effects of hypercalcemia, focusing on mental status changes
- To recognize the potential adverse effects of calcium supplementation with underlying hyperparathyroidism
- To identify a rare cause of posterior reversible encephalopathy (PRES)

Presentation
- 64yo female presented with altered mental status, generalized weakness, and decreased PO intake 6 days post-operatively from partial parathyroidectomy and total thyroidectomy.
- She was unable to provide much history due to confusion and disorientation
- Taking oyster shell calcium, Calcitriol, Vitamin D post-operatively
- PMH: DM, OSA, HTN, 1° hyperparathyroidism status post parathyroidectomy, multinodular goiter status post thyroidectomy, asthma, GERD, RBBB
- Physical Exam
  - VS: afebrile, HR 100, BP 159/88, RR 20, Pulse Ox 95% RA
  - NAD, PERRLA, dry MM, surgical incision anterior neck with steri-strips, no discharge, mild ecchymosis
  - Lungs: CTAB, CV: RRR, no murmurs
  - Abdomen: soft, NTND, +BS
  - Extremities: 2+ pitting bilateral LE edema
  - Neuro: CN II-XII grossly intact, AAOx3 during exam, but decreased attention span and confusing speech, with perseveration and repetition of numbers, i.e. “888-888-8888” for phone number
- Minicog – 2/3 word recall, unable to perform clock draw

Initial Laboratory Evaluation
- BMP: 138/3.5/100/31/6/1.01/129
- Ca 14.2
- Ionized Ca 1.9
- Total protein 7.1
- Albumin 2.9
- Hgb 11.4/35.5
- Troponin l 0.01
- TSH 0.85, normal T3/T4
- PTH 84
- CXR – no acute disease
- CT Head – no acute intracranial pathology.

Management
- Initially treated with aggressive IVF hydration, holding all calcium medications
- Mental status continued to worsen with mild HA - started on Lasix, calcitonin, and obtained MRI showing findings characteristic of PRES
- Pamidronate given for long-term calcium control, with calcium levels improving and stabilizing
- MS gradually improved with improvement of calcium, and repeat Minicog test was normal
- MRI also found incidental right frontal meningioma
- Repeat MRI with resolution of AMS showed reversal of occipital lobe changes, confirming diagnosis of PRES
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Imaging
- Initial MRI, waxing and waning AMS
  - Left frontal and bilateral occipital signal abnormality indicative of PRES
- Follow-up MRI after resolution of AMS
  - Resolution of PRES

After Discharge
- Patient followed up with her PCP, ENT, Endocrinology, Neurology, and Neurosurgery
- Calcium levels fluctuated mildly with outpatient monitoring, and levels gradually were stabilized with oral treatment, without resumption of presenting symptoms.

Discussion
- PRES is clinically characterized by AMS, visual disturbances, seizures, and headaches
- Through neuroimaging, PRES displays characteristic findings of reversible subcortical vasogenic edema, especially in the posterior occipital and parietal lobes
- Initially thought to be a result of severe hypertension, other common etiologies include eclampsia, renal failure, immunosuppression, and SLE
- Hypercalcemia is an extremely rare but documented cause of PRES, with 12 reported cases in literature identified
- Dysfunction of the blood-brain barrier is thought to underlie its development

Take Home Points
- In setting of AMS and hypercalcemia, diagnosis of PRES should be considered
- Prompt treatment of hypercalcemia and underlying etiology may help prevent further clinical manifestations, such as seizures or visual disturbances
- Severe hypertension, eclampsia, renal failure, and rheumatologic diseases are most commonly associated with PRES development

References