

Double Trouble After Sleeve Gastrectomy

Ashray Maniar, MD; Deanna Green, MD; Alan J. Hunter, MD
Department of Medicine, Oregon Health & Science University

Introduction

Micronutrient deficiencies are a known complication of bariatric surgery. This case illustrates thiamine deficiency in a post-bariatric surgery patient, and highlights the importance of close post-operative monitoring, educating patients on bariatric diet and recognizing key features of various nutritional deficiencies

Case Presentation

A 23-year-old woman 2 months status post sleeve gastrectomy in Saudi Arabia presents with acute diplopia, gait instability in setting of persistent post-operative nausea, vomiting and poor oral intake, resulting in the inability to take her supplemental vitamins

Physical exam

- Bidirectional horizontal nystagmus L > R, diplopia, gait imbalance

Lab results

138	100	2	92	12
2.7	23	0.3	8.0	235
				36.0

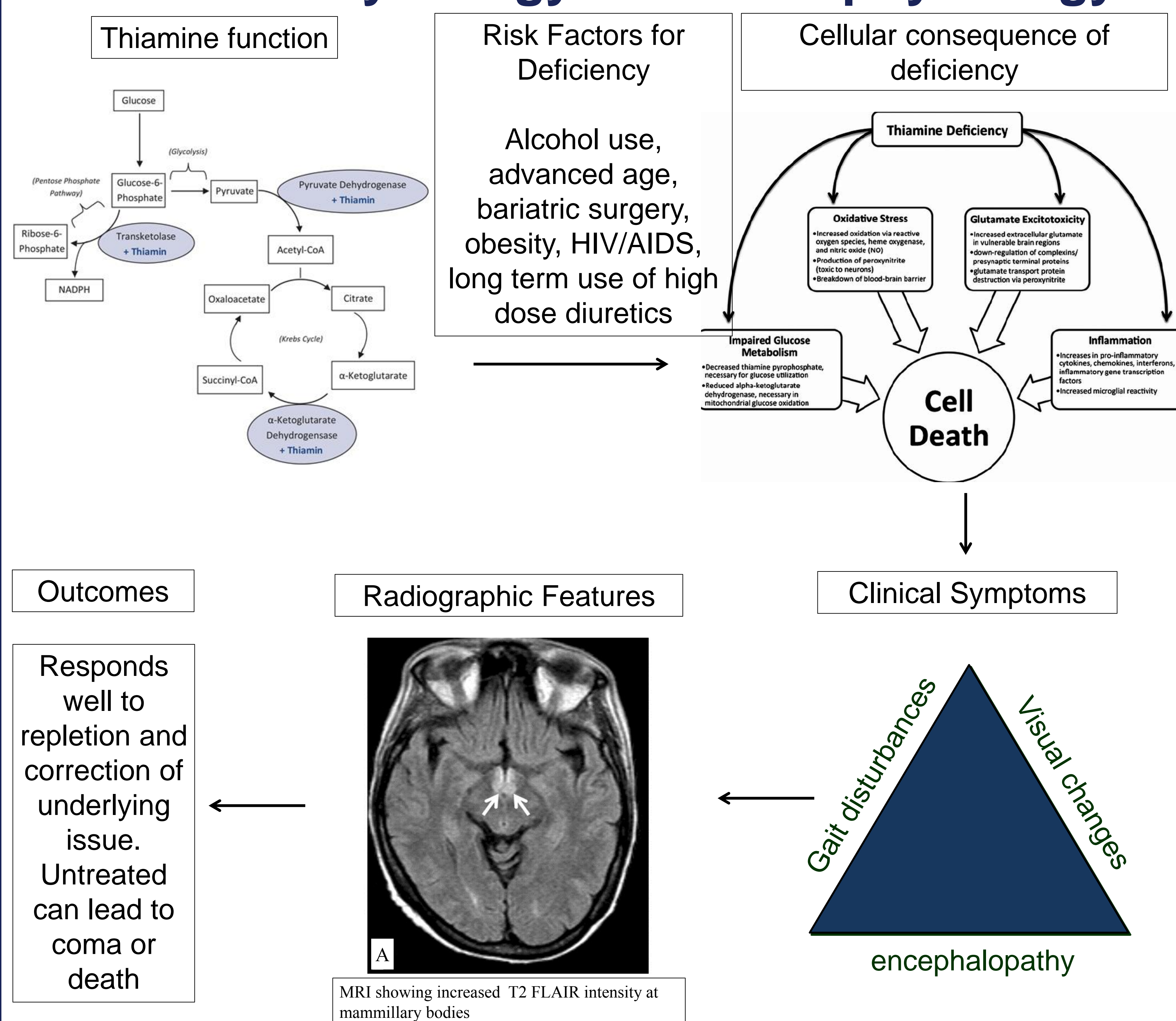
Ca²⁺ 9.4 Mg²⁺ 2.1 PO₄ 2.7
Alb 3.2 Normal liver panel

- CT head and MRI brain without abnormality
- CT abdomen: chronic fluid collection adjacent to stomach, without evidence of infection

Outcome

- Empirically treated with high dose IV thiamine 500 mg TID
- Symptoms improved within 12 hours of thiamine administration
- Further labs:
 - Thiamine: 42 nmol/L (70-180),
 - Vitamin B6: 4.9 nmol/L (20-125)
 - Vitamin A: 0.14 mg/L (0.3-1.2)
 - Normal vitamin E, Cu, Ferritin, and Zinc
- Symptoms resolved by day 3, transitioned to oral thiamine, educated on adherence to multivitamin regimen, bariatric diet and discharged with follow-up with nutrition and bariatric surgery

Thiamine Physiology and Pathophysiology



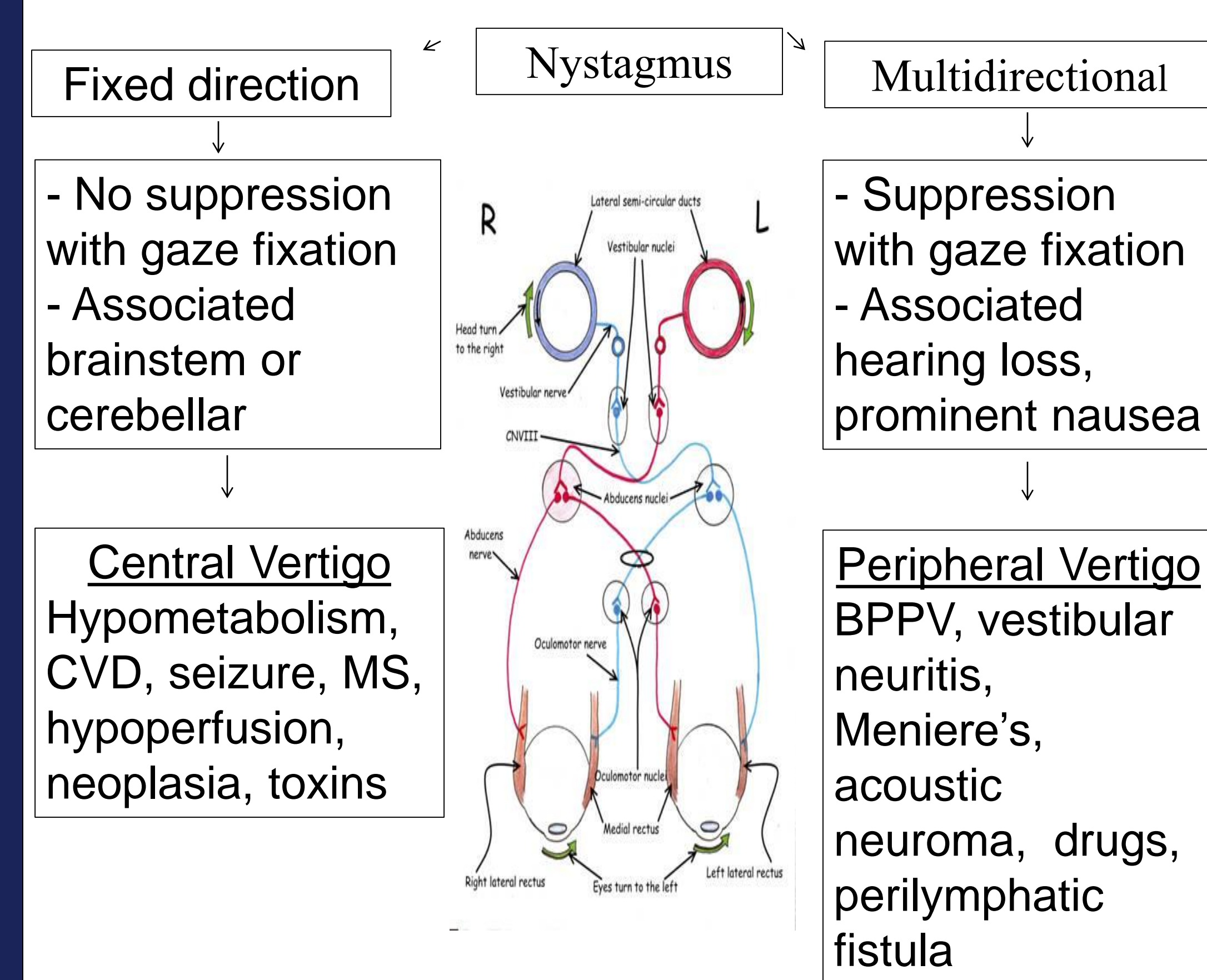
Thiamine Deficiency

- Thiamine deficiency manifests as wet or dry Beriberi, Wernicke-Korsakoff syndrome, and optic neuropathy
 - Beriberi is a Sinhalese phrase meaning “weak, weak” or “I cannot, I cannot”
- The Classic triad of Wernicke’s is only present in 10-16% of cases
 - Ocular dysfunction most commonly horizontal nystagmus > lateral gaze palsy > conjugate gaze palsy >>> complete ophthalmoplegia or pupillary defects
- Initial treatment should be with high dose intravenous thiamine for at least 3 days
 - Dose recommendations vary from 100-500 mg IV daily to multiple doses. Once resolved, should maintain daily 100 mg oral supplement

Micronutrient deficiencies following Bariatric Surgery

Vitamin (Frequency)	Manifestation	Treatment
Thiamine (**0-30%) (emesis is a key predisposing factor)	Within days-months: AMS, neuropathy, nystagmus, ocular palsy	Vitamin B1 100-500 mg IV TID → PO thiamine
Seen in both restrictive and malabsorptive surgery		
B12 (0-18%)	Occurs over months-years: Anemia, myelopathy, neuropathy	1000 ug IM x 8 weeks (daily → life long if neurologic sx)
Folate (very rare)	Anemia, risk for NT defects	5 mg daily
Vitamin D (25-75%)	Occurs over months-years: Bone loss, osteomalacia, hypocalcemia symptoms	50,000 IU D2 x 8 weeks
Vitamin A (0-11%)	Occurs over months-years: Dry eyes, reduced night vision	10,000-25,000 IU until improvement
Zinc (6%)	Occurs over months-years: Poor wound healing	60 mg (may deplete Cu stores)
Copper (~10%)	Anemia, leukopenia, neuropathy, myelopathy, ataxia	6 mg daily x7 → 4 mg qD x 7 → 2 mg
Vitamin E	Mimics B12 without anemia	
D-lactate acidosis	Anion gap metabolic acidosis + altered sensorium (Risks: short gut syndrome)	NPO, provide IV nutrition → long term carbohydrate restriction; Abx

Central vs Peripheral Vertigo



Mechanical Complications of Bariatric Surgery

Complication	Etiology	Symptoms	Treatment
Dumping syndrome	<ul style="list-style-type: none"> Pyloric sphincter incompetence vagus nerve insufficiency 	<p>Early</p> <ul style="list-style-type: none"> hyperosmolar gradient → diarrhea, bloating, vasomotor sx <p>Seen in both restrictive and malabsorptive surgery</p> <p>Late</p> <ul style="list-style-type: none"> hypoglycemia 	<ul style="list-style-type: none"> Avoid rapid absorbed carbs and lactose Acarbose somatostatin analogues
GERD	Multifactorial, more common in restrictive	Chest pain, burning sensation, metallic test, cough, sleeping disturbances	Dietary modifications, behavioral modifications, PPIs

Key Points

- As the frequency of bariatric surgery increases, post-operative complications will become more ubiquitous
- Bariatric surgeries carry a significant risk for multiple micronutrient deficiencies that are preventable with dietary education and vitamin supplementation
- Recognizing clinical features of multiple micronutrient deficiencies can lead to prompt diagnosis and treatment
- Thiamine deficiency is seen in both restrictive and malabsorptive surgeries, can be fatal if not rapidly treated

References

- Karatas, Mehmet. "Central vertigo and dizziness: epidemiology, differential diagnosis, and common causes." *The neurologist* 14.6 (2008): 355-364.
- Kerns, Jennifer C, et al. "Thiamine deficiency in people with Obesity." *Advances in Nutrition*, 6.2 (2015): 147-153.
- Katta, N et al. "Does long-term furosemide therapy cause thiamine deficiency in patients with heart failure? A focused review." *American Journal of Medicine* 129.7 (2016): 753.e7-753.e11.
- Zuccoli, G1, et al. "MR imaging findings in 56 patients with Wernicke encephalopathy: nonalcoholics may differ from alcoholics." *American Journal of Neuroradiology* 30.1 (2009): 171-176.
- Aasheim, Erlend Tuset. "Wernicke encephalopathy after bariatric surgery: a systematic review." *Annals of surgery* 248.5 (2008): 714-720.
- Alvarez-Leite, Jacqueline L. "Nutrient deficiencies secondary to bariatric surgery." *Current Opinion in Clinical Nutrition & Metabolic Care* 7.5 (2004): 569-575.