INTRODUCTION
Thiamine plays a significant role in cerebral metabolism, requiring 80% of the total thiamine in nervous tissue to process glucose as the primary energy source (Figure 1). Risk factors for thiamine deficiency include diminished intake, increased metabolic demand, and resuscitation with intravenous glucose-containing fluids. Thiamine deficiency can manifest in multiple clinical syndromes such as dry beriberi with peripheral neuropathy, wet beriberi with cardiomyopathy, and Wernicke-Korsakoff syndrome.

Commonly associated with chronic alcoholism, textbooks diagnose Wernicke’s encephalopathy as a triad of symptoms: encephalopathy, gait ataxia, and oculomotor dysfunction. However, recent meta-analyses only note one-third of patients presenting with all three clinical features.

CASE DESCRIPTION
HPI: 60-year-old male with medical history of transient ischemic attack (2015), hypertension, and type 2 diabetes, presented to the ED with 24-hour history of worsening disequilibrium after a seizure-like episode one day prior. At that time, patient reported 5-minute episode of sudden-onset weakness and tremors, which was attributed to hypoglycemia. The next day, patient reported worsening left-sided weakness and difficulty ambulating.

Of note, patient previously admitted in recent years for hypoglycemia and for alcohol withdrawal symptoms. At present, patient reports minimal alcohol use, with last drink of two servings of vodka two nights prior to admission.

PHYSICAL EXAM:
Vitals: Afebrile, BP 166/97, HR 79, RR 13, O2 100% on room air Neurological - drowsy, slowed speech, cranial nerves II through IX intact except pupils L reactive but R minimally constricts with light, strength 5/5 RUE/RLE, 4/5 LUE, +5/5 L LLE, gait unstable, finger-to-nose test negative B/L heel-to-shin test negative B/L, rapid alternating hand movements intact

CLINICAL COURSE
PERTINENT LABS:
Glucose: 209, CK 190, Ethyl alcohol <3, UDS negative Urinalysis: trace protein, 3+ blood

IMAGING:
CT angiography head neck with stroke protocol: revealed no hemodynamically significant stenosis, occlusion, or aneurysm. Stable atherosclerotic plaque noted in bilateral common carotid artery.

MRI brain revealed no acute infarcts, or hyper intensities around mamillary bodies, periaqueductal region of the midbrain, or thalamus (Figure 2).

DIFFERENTIALS:
• Acute ischemic cerebellar stroke
• Mixed hypoglycemic episode vs seizure
• Vestibular neuritis
• Chronic alcohol use disorder

DYSFUNCTION: Patient was started on intravenous thiamine with labs. Patient’s reported history of chronic alcohol use disorders: how well are we doing?

DISCUSSION
In this case, there was low suspicion for Wernicke’s encephalopathy given clinical history, physical exam findings, and labs. Patient’s reported history of chronic alcohol use disorder in setting of any acute neurologic changes should arouse need for thiamine supplementation. As thiamine is both concentration-dependent and transportation-dependent, intravenous thiamine replacement is preferred.

Oral thiamine is noted to have poor absorption in the setting of chronic alcohol use or other intestinal deficits. Given its low risks, all individuals suspected to have low thiamine (due to both alcoholic and non-alcoholic causes) should receive thiamine followed by glucose and magnesium supplementation.

CONCLUSION
Given the deleterious consequences of undertreating thiamine deficiency and cost versus benefit, parenteral replacement therapy needs to be prioritized for high-risk patients - alcoholics and individuals at risk for malnutrition.

High risk individuals for thiamine deficiency should be redefined as two of the following four signs:
1. dietary deficiencies or vomiting
2. eye signs
3. cerebellar dysfunction
4. altered mental status or mild memory impairment

Based on bioavailability and prior clinical-pathological studies, expert consensus for dosing recommendations are parenteral thiamine 500mg three times daily for at least two days, followed by 250mg daily for an additional five days.

- High thiamine levels are non-toxic to the body.
- Important to also co-administer magnesium.

REFERENCES