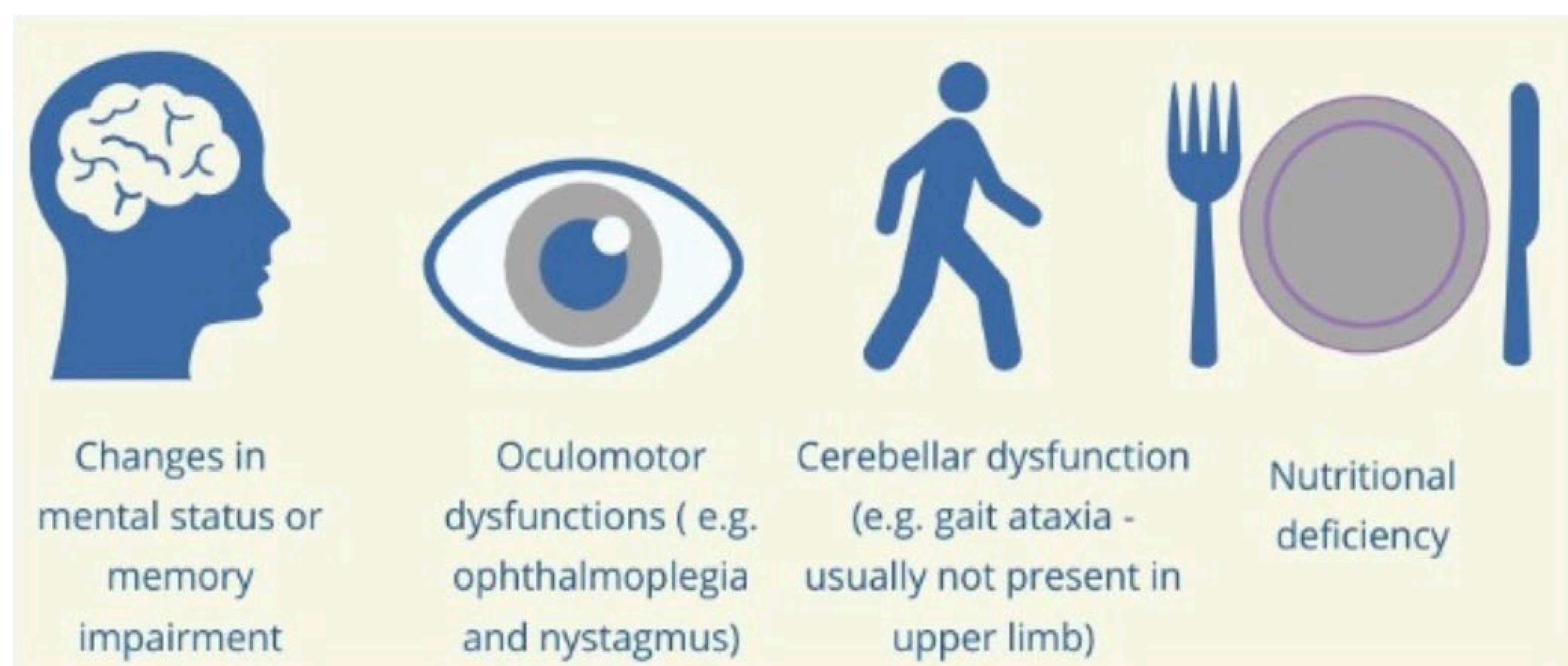


Wernicke Encephalopathy: Interplay Between Magnesium and Thiamine

Background

- Wernicke encephalopathy is an acute neuropsychiatric emergency due to thiamine deficiency.¹⁻⁴
- This condition occurs mainly in alcohol-dependent patients, or as a consequence of malnutrition from other causes such as: cancer, gastrointestinal surgery, hyperemesis gravidarum, starvation/fasting, gastrointestinal disease, and AIDs.
- It is readily reversible with thiamine, preferable within 48-72 hours of symptom onset.^{3,4}
- The classic triad of Wernicke encephalopathy includes a triad of gait ataxia, ophthalmoplegia/nystagmus, and global confusion.^{1,3, 5-7}



Neudrawlogy [@neudrawlogy]. Image of the Caine criteria for Wernicke encephalopathy. *Twitter*, 28 August 2021, 4:27 p.m., <https://twitter.com/neudrawlogy/status/1431715077820932096>.

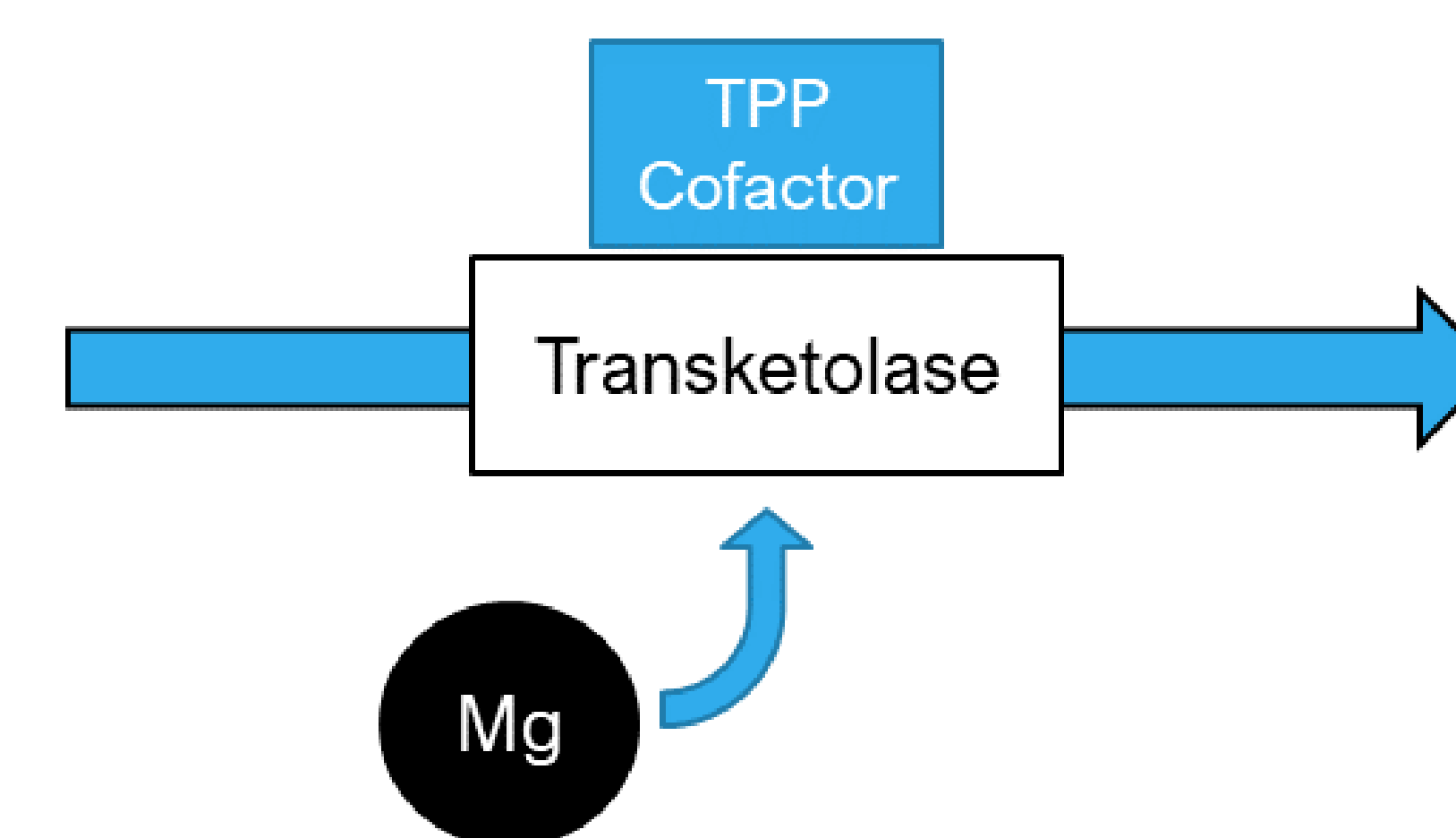
- However, this triad is only seen in 16-20% of cases.^{1,2} Thus, the clinical diagnosis of Wernicke encephalopathy is missed in 75-80% of cases.⁸⁻¹²
- Chronic alcoholic patients are at increased risk of developing deficiencies of thiamine and magnesium.¹⁻⁴
- Thiamine is an essential co-factor for a number of enzymes involved in carbohydrate metabolism and requires optimal levels of magnesium for biological function.^{3,4,10,13,14}
- While thiamine supplementation is well established for the treatment of alcoholic patients, the importance of magnesium is often overlooked.

Case Presentation

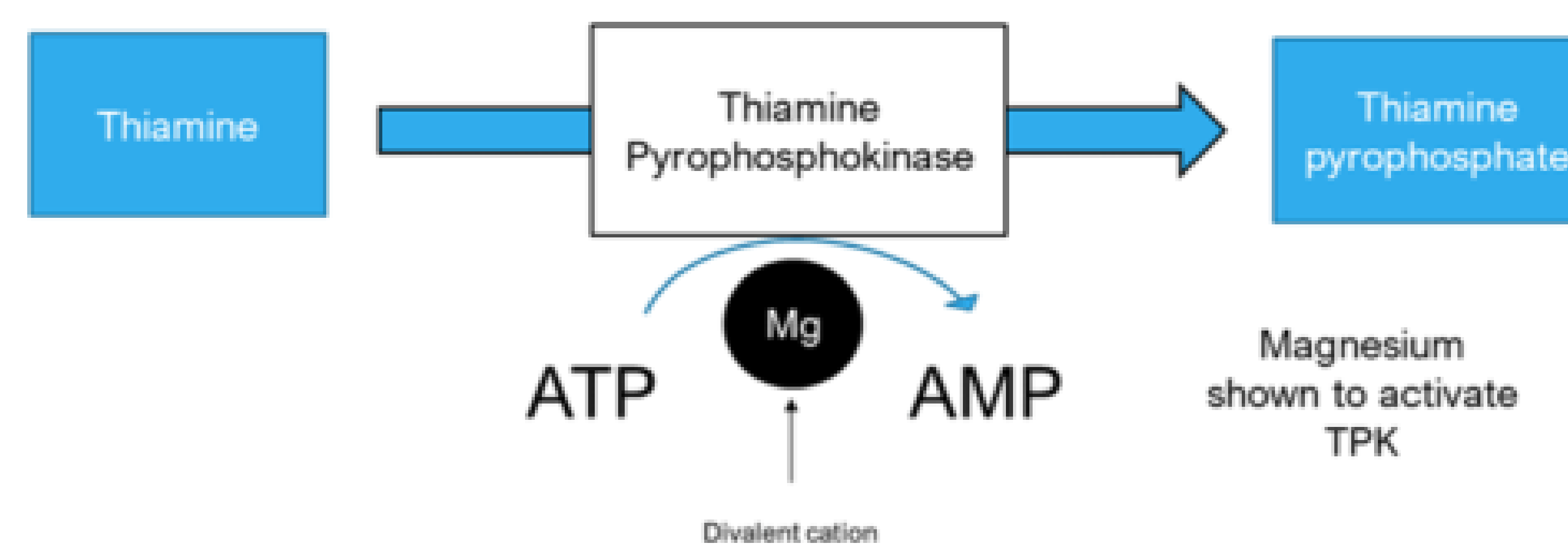
- 64-year-old male with PMH of thiamine deficiency, MVCAD s/p PCI, HTN, HLD, GERD, alcohol and tobacco abuse presents to for further evaluation of 2 days of lower extremity ataxia and acute onset of double vision, vertigo, and confusion.
- Patient noted to consume two bottle of champagne and twenty-four 12 ounce light beers each day.
- Per wife , patient eats less than 800 calories daily – only eating one meal per day at dinner time.

Pentose Phosphate Pathway

- Thiamine increases pathway
- Magnesium increases pathway
- Requires BOTH nutrients



Thiamine Activation



- On physical exam, patient noted to have gait ataxia, and confusion. Patient also appeared emaciated and had angular cheilitis and glossitis.
- Patient magnesium on arrival was critically low at 0.3 mg/dL.

Discussion

- Several laboratory studies have illustrated the importance of magnesium in carbohydrate metabolism.¹⁵⁻¹⁷
- This is the second reported case to illustrate the importance of magnesium administration in concurrence with parenteral thiamine in the acute management of Wernicke encephalopathy.¹⁸
- Our patient had the classic findings of Wernicke encephalopathy coupled with findings of nutrient deficiency on physical exam; thus, there was a high suspicion to evaluate for further electrolyte disturbances.

Conclusion

- This case reveals the importance of evaluating magnesium levels when there is high suspicion for Wernicke encephalopathy.
- The empiric administration of magnesium sulphate in conjunction with thiamine is not supported by the clinical evidence available at present.
- However, this case highlights the importance and supports the need for biochemical optimization.

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