

# An Unusual Case of Propylene Glycol Toxicity in a Patient with Amylophagia

Bill Chen, MD and Vesselin Tenev, MD, PhD

University of Iowa Hospital and Clinics, Department of Psychiatry, Iowa City, Iowa

## Background

Pica is commonly defined as a persistent eating of non-nutritional substance, and amylophagia is a subcategory of pica which involves the consumption of raw starch often in the form of laundry or corn starch.

## Case Report

- 29-year-old African American female with a history of iron deficiency anemia, alcohol use disorder, and amylophagia who presented with confusion and found to be in sepsis with electrolyte derangements and severe metabolic acidosis. She was admitted to the medical ICU for acute stabilization and treated with pressors and antibiotics.
- Toxicology evaluation noted that ingestion of large amounts of corn starch in addition to decreased clearance from an acute kidney and liver injury could have led to the acute toxicity in setting of chronic consumption.
- Our evaluation revealed that patient's pattern of corn starch ingestion came about when her grandmother gave it to her as "treats" in childhood. Recent stressors relating to the pandemic, unemployment, and having to take care of multiple relatives have led her to consume far more corn starch (16oz every 1-2 days) in the previous few months as well as increased alcohol intake.
- Unfortunately, due to multiorgan failure, she deteriorated during the hospital course and passed away after family decided on comfort care.

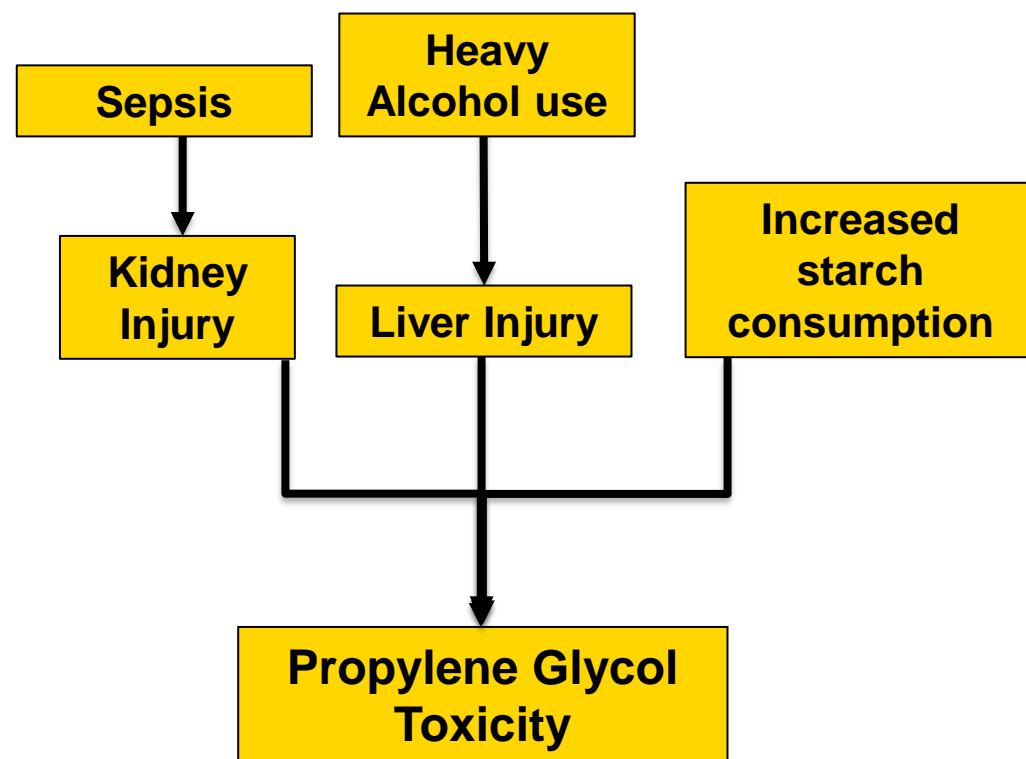


Figure 1. Mechanism of PG toxicity in this case

### Propylene Glycol

- Commonly added as a preservative in food products.
- Also found in antifreeze as well as IV medications such as Lorazepam and Phenytoin.
- Partly metabolized by liver and partly excreted via the kidneys.
- Toxicity typically results from kidney and/or liver dysfunction.<sup>6</sup>
- Severe toxicity can result in hemodynamic collapse and multiorgan failure.

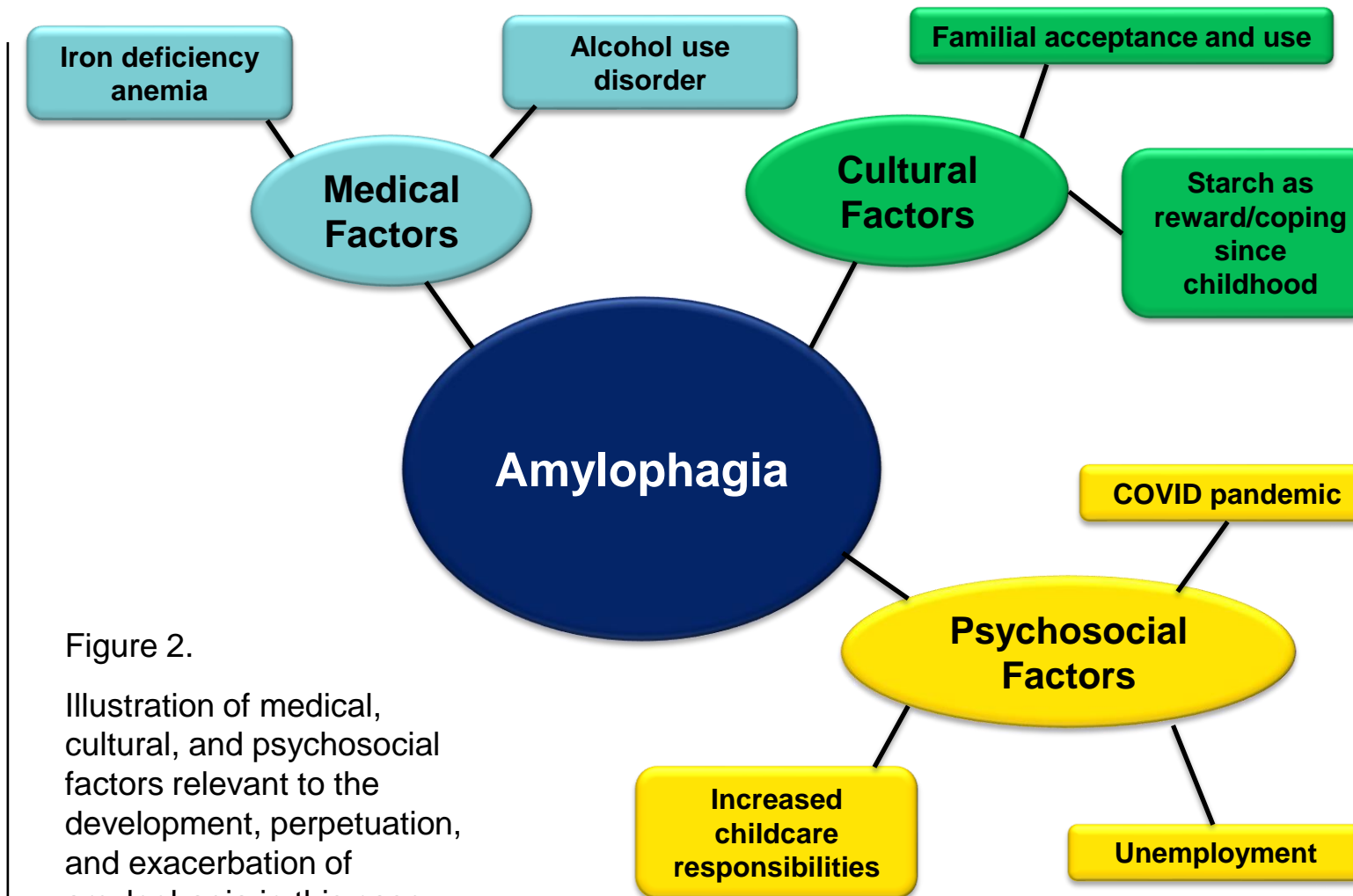


Figure 2.

Illustration of medical, cultural, and psychosocial factors relevant to the development, perpetuation, and exacerbation of amylophagia in this case

## Discussion

### Psychosocial Factors of Pica

- Psychosocial stress has been described as a significant factor in formation of pica with higher stress scores seen in children with pica.
- Typically, this stress is presented in childhood in the form of parental neglect, parental separation, a large family, or abuse. It is theorized that children attempt to solve their stresses by eating nonfood substances. Eating disordered behaviors observed more often in children with pica.<sup>5</sup>
- Pica may also represent "an expression of imitative behavior inherent in human development" just like when children eat food their pets eat as a learned behavior.<sup>3</sup>
- Pica in adulthood may represent as an act of "symbolic regression" resembling the thumb-sucking of an infant.<sup>3</sup>
- In recent studies, pica severity and frequency were correlated with stresses such as food insecurity as well as with psychological distress.<sup>4</sup>

### Cultural Factors of Pica

- Historically, pica has a strong cultural connection.
- In Mexico, clay are consumed sometimes as a part of religious symbology. In Africa, magical properties and well-being were attributed to soil where geophagia was a common practice.
- In some African American communities in the south, several forms of pica were practiced at social gatherings, effectively functioning as a food items. Furthermore, in some regions in the south, clay is used as a pacifier for infants.<sup>3</sup>

### Medical Factors of Pica

- Nutritional deficiencies such as iron deficiency have been postulated to be the driving force behind consumption.<sup>2</sup>
- Intellectual disability and damage to certain areas of the brain (e.g., Kluver-Bucy syndrome) have been associated with pica.<sup>1</sup>
- Recent studies hint that cravings for these substances were found to be similar in nature to that of opioids or alcohol and ingestion helped diminish the cravings.

For our patient, several of the discussed etiologies appear to play a role in her course of amylophagia. Medically, she has a history of iron deficiency anemia and alcohol use disorder. Culturally, she appears to be from a family where starch eating is used as a positive reinforcement for children which further developed into a coping tool for psychological stress. Psychosocially, the severity of her pica symptoms were highest during the pandemic in midst of unemployment and childcare responsibilities, suggesting a stress induced response.

## Conclusions

Pica has a multifactorial etiology and can perpetuate or exacerbate due to psychosocial stress. Psychiatrists should be aware of the potential dangers of severe amylophagia and other forms of pica.

## References

