Positive Propylene Glycol Result in a Patient with Ethylene Glycol Poisoning

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CASE DESCRIPTION

A 61-year-old man presented with an increased anion-gap metabolic acidosis, an increased serum osmolal gap, and a negative result in an alcohol screen. Gas chromatography revealed an increased ethylene glycol (EG) concentration (22 mg/dL) and a propylene glycol (PG) result that was below the lower limit of quantification (<5 mg/dL) (Fig. 1A). The patient was treated with hemodialysis, followed by phenytoin and a high-dose lorazepam infusion for a witnessed seizure. By 13 h, the EG concentration had fallen below the lower limit of quantification (<5 mg/dL); however, a peak identified as PG was observed, corresponding to a concentration of 27 mg/dL (Fig. 1B).

Fig. 1. Chromatograms of EG, PG, and 1,3-propanediol (internal standard).
(A), EG peak (22 mg/dL). (B), PG peak (27 mg/dL). +P, enablement of peak detection; −P, disablement of peak detection; 1,3-PRO, 1,3-propanediol.

QUESTIONS

1. What are the common causes of EG or PG poisoning?
2. What could cause a positive EG result and then a positive PG result in this patient?
3. What is the difference in toxicity between EG and PG?

The answers are on the next page.

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2 Nonstandard abbreviations: EG, ethylene glycol; PG, propylene glycol.
Ingesting automotive fluids, such as antifreeze containing EG or PG, can cause poisoning (1, 2). PG is also a solvent in many pharmaceuticals. Intravenous infusion of large amount of medications that use PG as a vehicle can cause PG poisoning (3–5). In our case, consumption of antifreeze led to the initial positive EG result, and the phenytoin treatment and a subsequent high-dose lorazepam infusion, both which contained PG, led to the positive PG result. This substance is less toxic than EG; however, poisoning cases associated with overdose of medications with PG as diluent have been described (3–5).

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