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To: ALL HEALTH CARE PROFESSIONALS
Subject: Anion gap acidosis / suspected toxic alcohol ingestion
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- Anion gap metabolic acidosis (AGMA) can occur in overdose patients for a variety of reasons (hypotension, seizures, agitation), but typically resolves when the underlying cause is addressed.
- Ingestion of ethylene glycol (EG) in antifreeze, methanol (MeOH) in windshield washer fluid or solvents, and less commonly diethylene glycol (DEG) in brake fluid, leads to AGMA from the acidic metabolites.
- Early presenters may have a normal AG but an increased osmole gap (OG) with measured > calculated osmolality. Calculated osmolality can be estimated using the formula $2 \times \text{Na} + \text{BUN}/2.8 + \text{glucose}/18 + \text{ethanol}/4.25$. If using the OG, it's essential to check ethanol, which can significantly affect osmolality.
- The OG is an inexact test. If intentional toxic alcohol ingestion is suspected, we recommend serum EG and MeOH levels as both can cause a similar AGMA, and histories may be unreliable. Samples are typically sent to a reference lab so that results are not available immediately.
- Fomepizole and ethanol inhibit metabolism of EG and MeOH. If intentional ingestion is suspected, we recommend starting fomepizole while EG and MeOH levels are pending.
- Because the half-life of MeOH is long (~52 hours) in patients receiving fomepizole, hemodialysis (HD) is usually recommended. Fomepizole dosing is typically adjusted during HD as it is cleared by dialysis.
- EG is cleared more efficiently by the kidneys, but HD is still recommended in cases of decreased kidney function or acidemia (pH <7.25) indicating presence of toxic metabolites.
- In patients with AGMA of unclear etiology, it may be reasonable to consider empiric fomepizole while EG and MeOH levels are pending – please call the poison center to discuss specifics of the case.
- Isopropyl alcohol (IPA) ingestion can cause CNS and respiratory depression, and increased OG, but without AGMA. People with alcohol use disorder sometimes drink IPA as an ethanol substitute.
- EG and MeOH levels are usually sent to a specialized reference lab such as ARUP in Salt Lake City (800-242-2787). DEG levels can be run by NMS Labs in Horsham, PA (800-522-6671).

To view an educational presentation on **Toxic Alcohol Poisoning** please visit <https://www.nebraskapoison.com>

Our certified nurse specialists in poison information and physician toxicologists are available 24 hours a day to answer your questions.