



# Poison HOTLINE

1-800-222-1222

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*Did you know .....*

**While acetylcysteine remains the cornerstone of therapy for APAP overdose, emerging evidence suggests fomepizole may also be helpful in treating acetaminophen (APAP) toxicity.** In such overdoses, fomepizole is thought to work by two main mechanisms: 1). inhibition of CYP2E1 (limiting the metabolism of APAP to the toxic metabolite NAPQI) and 2). inhibition of the c-jun N-terminal Kinase (JNK) enzyme which decreases some of the downstream cellular consequences of NAPQI. The specific indications, dosing, benefits, and risks of fomepizole have not been clearly established in the literature.

The use of fomepizole for an APAP overdose should be done in consultation with a toxicologist by calling the IPCC at **1-800-222-1222**.

## Ethylene Glycol and Methanol

Ethylene Glycol (EG) and Methanol (MeOH) are both toxic alcohols that are found in common household products such as antifreeze and deicers. EG is also present in several commercial and industrial products, while MeOH is an ingredient for windshield wiper solutions and gas additives. Toxicity can occur in doses as little as a teaspoon depending on the concentrations and the patient.

Oxalic acid, a metabolite of EG, can complex with calcium and form calcium oxalate crystals. These crystals precipitate in the kidneys which can lead to renal failure. Formic acid, a metabolite of MeOH, can cause visual problems and blindness. Aside from the damaging effects to these vital organs, severe and progressive high-anion gap metabolic acidosis can also develop from EG or MeOH. Hemodialysis may even be needed in severely toxic exposures.

The antidote of choice is fomepizole (Antizol) and it works by inhibiting alcohol dehydrogenase (ADH) to prevent conversion of the toxic alcohols to their toxic metabolites. The indications for fomepizole include: a confirmed EG or MeOH level of  $\geq 20$  mg/dL, a history of toxic ingestion, or a strong clinical suspicion of a potentially toxic ingestion (i.e., metabolic acidosis, elevated measured serum osmolality/osm gap, urinary oxalate crystals or renal failure). Ethanol therapy is an alternative antidote that can be beneficial in certain circumstances where fomepizole isn't readily available, used with the same indications listed above. Antidote administration and dosing should be done in consultation of poison control experts and toxicologists to ensure proper considerations are made.

Confirmatory toxic alcohol testing may be delayed since most laboratories send samples out to reference sites. If a patient is receiving fomepizole therapy, daily EG/MeOH levels should be monitored to guide end point therapy until it is no longer detected (usually  $< 20$  mg/dL). Please note that if a toxic alcohol sample is being sent to the University of Iowa, the requester must indicate the blood sample should be analyzed by gas chromatography. Lastly, when measuring for a serum osmolar gap, the measured serum osmolality should be drawn in conjunction with a metabolic panel and ethanol level to properly calculate. Despite the complexities, both EG and MeOH toxicity can share similar presenting symptoms, lab testing, calculations, toxic thresholds, and therapies. Please give us a call at **1-800-222-1222** if you suspect toxic alcohol poisoning in your patient.

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