### Ethylene Glycol (EG)

EG is present in some antifreezes/coolants/brake fluids/solvents. Deliberate ingestions are potentially lethal. CONSULT A CLINICAL TOXICOLOGIST EARLY

#### Toxicity / Risk Assessment

- Ingestion of >1 mL/kg 100% EG is potentially lethal
- Manage all deliberate ingestions as potentially lethal
- Accidental "less than a mouthful" exposures are usually benign
- Dermal and inhalation exposure does not cause toxicity

#### Clinical features:

- Rapidly absorbed: peak concentration 1-4 hours post ingestion
- Metabolized to acids responsible for the toxic effects
- During the 1-2 hours post EG exposure, osmol gap (OG) may be high (a normal OG does not exclude exposure), and the anion-gap (AG) and pH will be normal
- As EG is metabolized, the OG↓, pH↓ and the AG↑
- Co-ingestion of ethanol delays onset of toxicity

#### STAGE 1 (1-12 hours):

- Ataxia, slurred speech, drowsiness
- (similar to ethanol intoxication)

#### STAGE 2 (6-24 hours):

- AG↑/acidosis, ↑RR ↑HR ↑BP ↓GCS

#### STAGE 3 (24-72 hours):

- Progressive acidosis, ARF, ↓Ca²⁺, seizures, coma, death

*Calcium oxalate crystalluria is diagnostic (present in <50%)*

#### Management

- More acidosis = worse outcome. Early treatment = good prognosis
- Any delay in commencing treatment with an antidote results in more severe toxicity.
- Decontamination: Activated charcoal does not adsorb EG and is not indicated.
- Laboratory: Obtain U&E/VBG/ethanol/glucose/AG/measured osmolality at the same time.
- Calculated osmolarity = 2[Na⁺] + urea + glucose + 1.25[ethanol] (concentrations in mmol/L)
- Osmol Gap (OG) = Measured osmolality - Calculated osmolarity
- EG concentrations are generally not readily available; use surrogate markers (pH/AG/OG)
- Antidote: use an alcohol dehydrogenase blocker such as ethanol or Fomepizole (4-MP)
  - Administer ethanol IV/NG tube. See Ethanol guideline. Aim for a serum ethanol conc. 0.1-0.15 g/dL
- **Indications for Rx with an antidote:**
  - Documented history of ingestion & OG>10
  - OR suspicion of ingestion AND at least 2 of: pH <7.30, HCO₃ <20, OG >10, urinary oxalate crystals
  - OR EG concentration of > 20 mg/dL
- **8.4% Sodium Bicarbonate:** correct acidaemia if pH <7.30 (bolus of 1-2 mL/kg 8.4% solution)

#### Enhanced elimination

- Intermittent haemodialysis is the preferred modality. (Discuss with clinical toxicologist)
- **Indications:** acidosis / ARF / haemodynamic instability (continue until acidosis resolves)
  - Increase ethanol / 4-MP infusion rate during haemodialysis
- **Cofactors:** IV pyridoxine & thiamine may help in metabolism to non-toxic metabolites.
- **Disposition:** Discharge pending mental health assessment if well + normal pH + HCO₃ >20 + OG <10 + ethanol is undetectable at least 4-hours post ingestion

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**AUSTIN CLINICAL TOXICOLOGY SERVICE GUIDELINE**

**POISONS INFORMATION CENTRE: 13 11 26**

Version 3: Published 1/2020. Review 1/2023