Toxic Alcohol Treatment

**Recommended laboratory investigations** required to calculate an anion gap and osmolar gap.
*ideally these labs are all drawn at the same time*

1. Venous blood gas (arterial acceptable)
2. Lactate
3. Chemistry: Na+, K+, Cl, HCO3, creatinine, BUN, amylase, glucose
4. Serum osmolality
5. Serum ethanol
6. Toxic alcohol levels: methanol, ethylene glycol, isopropanol, acetone, propylene glycol
   - Note that ethylene glycol may need to be ordered separately in addition to a “Toxic alcohol” or “Volatile” screen – depending on the local laboratory

**Calculations:**

- **Anion Gap** = Na – (Cl + HCO3)
  - Abnormal >12

- **Calculated Osmolality** (using SI units) = (Na x 2) + Urea + Glucose + (Ethanol (mmol/L) x 1.25)

- **Osmolar Gap** = Measured Osmolality – Calculated Osmolality
  - Abnormal >10

**Laboratory Investigations should be repeated as follows:**

IF methanol/ethylene glycol levels are NOT available AND the patient has a possible exposure (eg. a child found in the vicinity of a container) AND an ADH blocker is NOT recommended: measure venous blood gases, electrolytes, creatinine, glucose, and osmolarity Q4H to determine need for intervention or discharge.

IF an ADH blocker has been recommended: measure venous blood gases, electrolytes, BUN, glucose, osmolarity and methanol / ethylene glycol levels (if available & as appropriate) (IF now known to be ethylene glycol, only do the relevant level) q12h to determine need for further dosing.

IF dialysis has been recommended: measure venous blood gases, electrolytes, BUN, glucose, osmolarity and relevant toxic alcohol levels (if available), q4h to determine need for continued dialysis.

**Interventions:**

**Alcohol Dehydrogenase (ADH) Blocker**

Fomepizole (4-methylpyrazole, or 4-MP) is the preferred antidote for toxic alcohol poisoning. Indications for antidote treatment with fomepizole are evaluated on a case-by-case basis by the toxicologist on call. Ethanol (PO or IV) is an alternative antidote, but, is only considered if fomepizole is not available.

**Fomepizole Administration:** If fomepizole is advised by the consulting toxicologist, dose as follows:

- **LOADING DOSE** (Time 0 hours): 15 mg/kg in 100 mL D5W OR NS intravenously infused over 30 minutes
- Time 12 hours: 10 mg/kg in 100 mL D5W OR NS intravenously infused over 30 minutes
- Time 24 hours: 10 mg/kg in 100 mL D5W OR NS intravenously infused over 30 minutes
- Time 36 hours: 10 mg/kg in 100 mL D5W OR NS intravenously infused over 30 minutes
- Time 48 hours: 15 mg/kg in 100 mL D5W OR NS intravenously infused over 30 minutes

Any further doses, given 12 hours apart, until stopping rules are met, are 15 mg/kg in 100 mL D5W OR NS infused intravenously over 30 minutes
IF the patient is being dialyzed, the dosing interval changes to every 4 hours (instead of every 12 hours) until dialysis has ended.

IF the patient has co-ingested ethyl alcohol, fomepizole can be delayed until the serum ethanol level falls to < 23 mmol/L.

**Fomepizole Stopping Rules:**
- IF fomepizole was started AND the level of methanol OR ethylene glycol are available to the treating hospital, STOP fomepizole when [methanol] < 6 mmol/L OR [ethylene glycol] < 3 mmol/L respectively AND the acidosis is corrected.
- IF fomepizole was started for high suspicion of methanol OR ethylene glycol exposure, AND the osmolar gap was elevated >10 mOsm/L, STOP fomepizole when the osmolar gap is zero AND the acidosis is corrected.

**Cofactors**
Folinic acid (Leucovorin®) OR Folic Acid 1-2 mg/kg IV infusion (adult or peds) over 30 minutes q4-6h (assume maximum body weight of 100 kg)
  - For any potential toxic alcohol ingestion, OR
  - Until Methanol level is negligible

Thiamine 100 mg IV by slow push (adult) (peds: 50 mg IV) q8h
  - Consider if patient is a chronic alcoholic or the toxic alcohol could be Ethylene Glycol & no level yet available, OR
  - Until Ethylene Glycol level is negligible

Pyridoxine 50 mg IV by slow push (adult & peds) q6h
  - If the toxic alcohol could be Ethylene Glycol & no level yet available OR
  - Until Ethylene Glycol level is negligible

Correct acidosis with a bicarbonate infusion to target serum pH > 7.2.

**Dialysis:** Recommendations to be made in consultation with the on-call toxicologist.