Methanol (MeOH)

Deliberate self-poisoning with MeOH is often lethal without early antidotal intervention. CONSULT A CLINICAL TOXICOLOGIST EARLY.

Sources: model airplane fuel, car racing fuel, home brew.

Domestic methylated spirits does NOT contain MeOH

Toxicity / Risk Assessment

- Deliberate self poisonings or ingestions > 0.5 mL/kg of 100% MeOH can be lethal
- Ingestions of > 10 mL 100% MeOH can cause toxicity
- Dermal + inhalational exposure can cause toxicity (rare)

Clinical features:

- Early features are similar to ethanol intoxication
- MeOH metabolism produces acids resulting in severe metabolic acidosis, coma, and visual impairment (latent period 12-24 hours before this is apparent)
- Initial high osmolar gap (OG) & low anion gap (AG): as MeOH is metabolized, the OG ↓ and the AG ↑
- A severely poisoned patient can present early with normal AG and pH but the OG will usually be high
- A normal OG, however, does not exclude MeOH toxicity
- Co-ingestion of ethanol delays onset of toxicity
- Up to 1/3 patients suffer permanent visual impairment

Management

Any delay in commencing treatment with an antidote (ethanol)= more severe toxicity= worse prognosis

Decontamination: Activated charcoal does not adsorb MeOH and is not indicated.

Labs: **MeOH concentrations** are generally not readily available; use surrogate markers (pH/AG/OG)

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

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 treatment with an antidote:

Documented history of ingestion **AND** OG>10 OR raised AG

OR suspicion of ingestion **AND** at least 2 of: pH <7.30, HCO3 <20, OG >10, visual disturbance

OR MeOH concentration of > 20 mg/dL

Na Bicarbonate: correct acidaemia if pH <7.30 (commence with bolus of 1-2 mL/kg 8.4% solution)

Enhanced elimination: Intermittent haemodialysis is the preferred modality.

Indications: acidosis/coma / ARF / haemodynamic instability / requirement for antidotal Rx

- Increase ethanol / 4-MP infusion rate during haemodialysis

Cofactors: IV folinic acid 30 mg q6h for 48 hours may aid MeOH metabolism to non-toxic metabolites.

Disposition - Discharge pending mental health assessment if well + normal pH + HCO3 >20 + OG <10 + ethanol is undetectable at least 8 hours post ingestion