31. Alcohol (Methanol) Poisoning Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

Suspected Methanol Poisoning

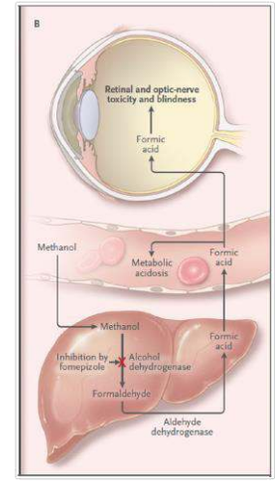
Methanol toxicity commonly affects the **neurological, ophthalmological**, and **gastrointestinal** systems.

a) Within the **first 24 hours**, **central nervous system (CNS)** depression, euphoria, and inebriation occur.

b) This is followed by a **latent period (**between **6 and 30 hours)** during which methanol is **metabolized to formic acid,** which ultimately leads to systemic effects.

c) **Ophthalmologic symptoms** can range from blurry vision, decreased visual acuity, and photophobia to blindness or the classic "snowstorm" vision. A complaint of **blurred vision with a relatively clear sensorium** should strongly suggest the diagnosis of methanol poisoning. Initially, visual fields are not affected and patients may have a central scotoma (blind spot). If unrecognized and not appropriately treated, these changes will result in;
- permanent blindness,
- absent papillary response, and
- permanent optic nerve atrophy.

d) Methanol toxicity causes **gastrointestinal symptoms** such as abdominal pain with or without evidence of pancreatitis and/or hepatotoxicity.



In severe cases, the odour of formaldehyde may be present on the **breath** or in the **urine**. Untreated methanol poisoning is associated with a **rate of death** of **28%** and a rate of **visual deficits or blindness** of **30%** in survivors.

- Monitor, support ABCs; **Consider Advanced Airway or nursing in recovery position for airway protection**
- Check vital signs (BP, PR, RR, SPO_2, T° C, **RBS**).
  - Start Oxygen **IF** SPO_2 < 94%. Maintain $SPO_2 \geq 94\%$
  - If **Hypoglycaemic** (RBS < 3.3 mmol/L), give **50mls 50% dextrose IV** (**see 18. Hypoglycaemia Algorithm**). Also, give **100mg Thiamine IV** followed by 100mg PO BD for 6 weeks.
- Send samples for **FBC, UEC, LFTs**. Correct any electrolyte imbalances (**see 19: Electrolyte Abnormalities Algorithm**)
- **Start IV Fluids** – If hypotensive give repeated **NS/RL boluses at 20mL/Kg** until perfusion is restored (MAP > 65) and dehydration is corrected. More rapid administration and large amounts of fluid may be needed in some patients. When stable, start **5% dextrose saline** infusion at **3L/24 hrs**
- Perform brief, targeted history, physical exam
- **DO NOT PERFORM GASTRIC LAVAGE.** If the patient's airway is protected, anecdotal evidence supports the use of gastric **aspiration** if large amounts of alcohol have been ingested and the patient can be treated very quickly (within an hour) after the ingestion.
- **DO NOT GIVE ACTIVATED CHARCOAL** unless the patient has co-ingested other poisons (**see 29. Poisoning Algorithm** for indications and contraindications for activated charcoal)

Give Ethanol (also see 29. Poisoning Algorithm)

Based on in vitro studies, ethanol's affinity for alcohol dehydrogenase is more than that of methanol by 15-fold and thus competes for the enzyme preventing methanol from being metabolized to the toxic metabolite, formic acid. Ethanol may be given orally or through an intravenous infusion.

Oral Dose:

Loading dose: 0.8g/kg in a 20% ethanol solution diluted in juice.

Maintenance dose: 80mg/kg/h; increase to maintain a serum ethanol concentration of 100- 150mg/dL.

IV Dose:

Loading dose: 0.6 - 0.8 g/kg in a 10% ethanol solution in D5W (volume/volume).

Maintenance dose: 80 to 130 mg/kg/h

Higher maintenance doses are used in patients with chronic alcoholism or during haemodialysis.

Side effects of ethanol treatment include; hypoglycaemia, CNS depression, intoxication, thrombophlebitis, and hypotension.

- **Consult a Physician**
- Monitor, support **ABCs, Vital signs** (BP, PR, RR, SPO_2, T° C, **RBS**) and **UEC**.
- **Consider haemodialysis** for large methanol ingestions, severe metabolic acidosis (pH < 7.25-7.30), vision abnormalities, renal failure, electrolyte abnormalities not responsive to conventional treatment, haemodynamic instability refractory to intensive care treatment and serum concentration > 50mg/dL
- **Transfer to ICU**