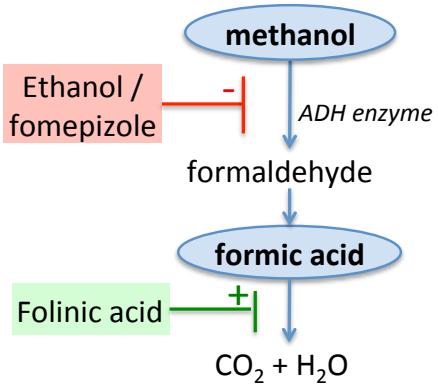
Methanol poisoning at a glance
- with no means of analytical equipment available



Methanol is not toxic itself, but it is metabolized to the highly toxic formic acid/formate (see fig): The treatment is focused on blocking the enzyme (ADH) with either ethanol or fomepizole, buffer the metabolic acidosis with bicarbonate, and if possible use dialysis to remove methanol, formate and correct the metabolic acidosis.
Folinic acid may also be given to enhance the endogenous metabolism of formate.
All of the above should be initiated as early as possible, but any of these treatments are important –
Use what you have available!

Diagnosis:

- **History:** Intake of illegal/bootleg alcohol, others in the environment with confirmed or suspect methanol poisoning (seriously ill, fatalities, blindness etc.). **Symptoms appear after >12-24 hrs**.
- **Symptoms**: hyperventilation (respiration (RF) >20-25/min)/dyspnoea, visual disturbances (all kinds of), GI-symptoms (frequently vomiting), chest pain, severe/unusual "hangover".

Treatment:

- Give **antidote** (***ethanol*** orally or intravenously – dosing: *See opposite side)* **without delay**

- Give **bicarbonate ($NaHCO_3$)** as soon as possible intravenously.
  - **500 mmol/L:** Give 250-500mL or more within 1-2 hours until hyperventilation is corrected (RF <20 /min).
  - **167 mmol/L**: Give 1000-1500mL or more within 1-2 hours until hyperventilation is corrected (RF <20 /min).
- If only oral treatment is available: Tablets of 500 mg bicarbonate (= 6 mmol), 6-10 tablets every hour until hyperventilation is corrected (RF <20 /min).

- **Folinic acid** (or folic acid) 50mg iv. or orally (e.g. 10 tablets of 5mg) every 6 hours for 24-48 hrs.
- If **intubation is necessary:** The patient must be hyperventilated (RF >25/min) (until metabolic acidosis is corrected). ***Transfer to a unit with dialysis facilities and ICU is recommended***.

Criterion for treatment when methanol poisoning is suspected (clinical findings only):

A. **Asymptomatic patients**: Observe for up to 24 hours (depending on level of suspicion).
B. **Hyperventilation, no visual disturbances**. Adequate blood pressure/pulse: Give 1-2L of iv fluids (e.g. NaCl) + thiamine + glucose. If hyperventilation does not disappear: Give ethanol and bicarbonate. Observe minimum 24 hours.
C. **Hyperventilation, visual disturbances, conscious:** Give ethanol, bicarbonate, folinic acid, transport to dialysis facilities if possible
D. **Hyperventilating, unconscious:** Give ethanol, bicarbonate, folinic acid, transport to dialysis facilities
E. **Normoventilating/slow breath, unconscious:** Likely poor prognosis if methanol poisoning. Be careful with ethanol in case this is a ethanol intoxication instead *unless confident of methanol poisoning*. Give bicarbonate, folinic acid, and consider transport to referral hospital if possible

Prognostic aspects

Coma on admission and lack of hyperventilation indicates poor prognosis if the patient is suffering from methanol poisoning, but pure ethanol intoxication or a combination of those may be a differential diagnosis

When to call for assistance:
If there are patients with a strong suspicion of methanol poisoning, call the local referral hospital for advice and to discuss possibilities for intervention.
One of the most important reasons for this is the possibility to identify toxic alcohol in the environment, start early treatment ***AND*** be able to warn the public about the possible danger.

Where there is one there is usually many

Suggested dosing regimen for ethanol (be aware of individual differences and frequent under-dosing). Treatment with antidote should be continued for 5-7 days if no dialysis is given:

	5% ethanol	10% ethanol	20% ethanol	40% ethanol
Loading dose	15mL/kg	7.5mL/kg	4mL/kg	2mL/kg
Drinking dose/hour (not regular drinker)	2mL/kg/hr	1mL/kg/hr	0.5mL/kg/hr	0.25mL/kg/hr
Drinking dose/hour (regular drinker)	4mL/kg/hr	2mL/kg/hr	1mL/kg/hr	0.5mL/kg/hr

Rule of thumb: Beer contains 5%, wine 12-14% and spirits 40-45% ethanol.

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