Carbon Monoxide (CO)

Overview

Common lethal poisoning due to tissue hypoxia. Symptoms non-specific

Toxic mechanism

Hb binding affinity 210x that of O_2 → hypoxia. Also binds to cellular cytochromes and initiates endothelial oxidative injury and inflammatory cascade.

Toxicokinetics

$T\frac{1}{2}$ depends on pO_2. In room air: 4hr, 100% O_2: 90min, hyperbaric O_2 at 3atm: 23min.

Clinical features

CNS: headache, N&V, dizziness, confusion, poor conc, cerebellar signs, seizures, syncope, coma
CVS: ↑HR, ↑BP, ischaemic ECG or MI, dysrhythmias, ↓BP
Resp: Non-cardiogenic APO
Metabolic: Lactic acidosis, rhabdo, ↑BSL
Other: myalgia, DIC, bullae, alopecia, sweat gland necrosis, neurological & neuropsychiatric SE.

Investigations

Screening: ECG, paracetamol, BSL
Specific bloods: ABG, CO-Hb, lactate, β-hCG, FBC, UEC

COHb Level	Effect
<10%	Background level in smokers
10%	Asymptomatic, slight headache
20%	Dizziness, nausea, dyspnoea, throbbing headache
30%	Vertigo, ataxia, visual disturbance
40%	Confusion, coma, seizures, syncope
50%	CVS & resp failure, arrhythmia, seizures, death

Other as indicated: Trop/CK, CT/MRI brain, neuropsychiatric testing at 3-12mo.

Risk assessment

Deaths occur prehospital, however morbidity may be affected by hospital Rx.
Higher risk for sequelae when low conc prolonged exposure (accidental) than high conc short duration (car exhaust parasuicide).
Other high risk factors:

- Significant LOC/coma
- Persistent neurological dysfunction or confusion
- Cerebellar signs
- Metabolic acidosis
- Myocardial ischaemia
- Age>55y
- Fetus

Loose correlation with COHb level.

Management

Resus & Supportive Care*:* ABCs.
Decontamination: Remove source.
Enhanced Elimination:

- Normobaric O_2 until asymptomatic (24h if pregnant) - no evidence ↓sequelae.
- Consider hyperbaric O_2 if high risk. Controversial (?proven benefit, ?end point, & ?avail)

Disposition

D/C when asymptomatic. If end organ ischaemia → HDU/ICU. Neuropsych follow up at 1-2mo.