Carbon Monoxide (CO)

Lab 8

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Carbon Monoxide (CO)

- Is a colorless, odorless, tasteless, & nonirritating gas produced by the incomplete combustion of any carbon containing material (car smoke, cigarette smoke, firing).

Mechanism of toxicity:

- CO bind to Hb to form carboxy-Hb with an affinity 250 times than that of O2, resulting in reduced blood O2 carrying capacity (anemic hypoxia).
- CO directly inhibits cytochrome oxidase which disrupts cellular function.
- CO can bind to myoglobin which contributes to impaired myocardial contractility.

Clinical signs & symptoms:

- Intoxication occurs mainly in organs with high O2 consumption such as brain & heart.
- The majority of pts complain of headache, dizziness, & nausea. Pts with coronary disease may experience angina or MI. With more severe exposure syncope, coma, convulsion, hypotension, cardiac arrhythmias, & death may occur.
- Survivor from serious CO poisoning may suffer from neurological consequence ranging from Parkinsonism to impaired memory & concentration.

Effects of carbon monoxide in relation to the concentration in parts per million in the air:[34][35]

Concentration	Symptoms
35 ppm (0.0035%), (0.035‰)	Headache and dizziness within six to eight hours of constant exposure
100 ppm (0.01%), (0.1‰)	Slight headache in two to three hours
200 ppm (0.02%), (0.2‰)	Slight headache within two to three hours; loss of judgment
400 ppm (0.04%), (0.4‰)	Frontal headache within one to two hours
800 ppm (0.08%), (0.8‰)	Dizziness, nausea, and convulsions within 45 min; insensible within 2 hours
1,600 ppm (0.16%), (1.6‰)	Headache, increased heart rate, dizziness, and nausea within 20 min; death in less than 2 hours
3,200 ppm (0.32%), (3.2‰)	Headache, dizziness and nausea in five to ten minutes. Death within 30 minutes.
6,400 ppm (0.64%), (6.4‰)	Headache and dizziness in one to two minutes. Convulsions, respiratory arrest, and death in less than 20 minutes.
12,800 ppm (1.28%), (12.8‰)	Unconsciousness after 2–3 breaths. Death in less than three minutes.

Treatment:

- Initial treatment for carbon monoxide poisoning is to immediately remove the person from the exposure .
- Those who are unconscious may require CPR on site.
- Administering oxygen via non-rebreather mask shortens the half-life of carbon monoxide from 320 minutes, when breathing normal air, to only 80 minutes.
- Oxygen hastens the dissociation of carbon monoxide from carboxyhemoglobin, thus turning it back into hemoglobin.
- pregnant women are treated with oxygen for longer periods of time than non-pregnant people.