

CARBON MONOXIDE AND SMOKE INHALATION

NOTES ON CARBON MONOXIDE

BACKGROUND:

Carbon monoxide (CO) is a colorless, odorless gas. It is a common product of combustion of any organic material and is a major toxic component in cases of smoke inhalation. Carbon monoxide causes poisoning by interfering with the binding of oxygen to hemoglobin in the blood, myoglobin in heart and muscle tissue and possibly by interfering with oxygen utilization in the cell. Symptoms of progressively worse exposure include, in order: headache, dizziness, giddiness, tinnitus, nausea, muscle weakness, chest pain, dyspnea, syncope, seizures and coma. Cherry-red skin coloration is not commonly seen (except post-mortem) and should not be relied upon for diagnosis. The half-life of CO in the blood is from 5 to 9 hours when the victim is breathing room air, compared to 60 – 90 minutes when breathing 100% oxygen.

POTENTIAL FOR SECONDARY CONTAMINATION:

Very small amounts of CO can be trapped in a victim's clothing after an overwhelming exposure, but are not usually sufficient to create a hazard for health care personnel away from the scene. Decontamination is not necessary for CO exposure alone.

NOTES ON SMOKE INHALATION

BACKGROUND:

Smoke inhalation injury results from the combined effects of the various inhaled components as well as direct thermal injury to the airway. Common toxic components of smoke include carbon monoxide, hydrogen cyanide, irritant gases such as acrolein, ammonia, hydrogen chloride, phosgene, nitrogen oxides, metal fumes and carbonaceous particulates. The proportion of each component depends on the substances and conditions of the combustion. Fires involving chemicals may produce smoke with very high concentrations of toxic substances. Stridor, wheezing, tracheobronchitis and acute upper airway obstruction may occur from irritant gases and thermal effects. Acute non-cardiogenic pulmonary edema and chemical pneumonia may occur shortly after exposure or may be delayed up to several hours, especially after exposure to nitrogen oxides.

In any victim with altered mental status, suspect inhalation of a systemic toxin such as carbon monoxide, hydrogen cyanide (see protocol), agents producing methemoglobinemia (see protocol), or smoke containing with a stored chemical such as pesticides or those found in combustion of drug laboratory chemicals.

POTENTIAL FOR SECONDARY CONTAMINATION:

Although small quantities of acid, amine or ammonia mists may be absorbed onto clothing from smoke, they pose no significant risk of secondary contamination of rescuers outside of the hot zone, even though odor and carbon deposits may be a nuisance. If the victim has been exposed to heavy concentrations of liquid or vapor from a chemical, then removal of clothing and flushing with water is appropriate.

INITIAL DECONTAMINATION PRIOR TO PREHOSPITAL MANAGEMENT:

SUBJECT: Ambulance Response to Hazardous Materials Spills

POLICY: 6200

DATE: 06/01/91

Decontamination with smoke inhalation should include removal of contaminated clothing and flushing skin for 1 – 2 minutes if the victim has been exposed to a heavy concentration of liquid or vapor from a chemical.

PREHOSPITAL MANAGEMENT AFTER INITIAL DECONTAMINATION

SMOKE INHALATION

FORMS: Toxic Gases, vapors and particulates formed by combustion.

CARBON MONOXIDE

FORMS: Gas

- Evaluate Airway *
- Oxygen – High Flow/Tight Fitting NRM
- Cardiac Monitor
- Transport

BASE:

CONSIDER:

Draw Blood – lavender top for carboxyhemoglobin
IV

Albuterol 0.3 cc in 2.5 cc NaCl for smoke inhalation patients with wheezing.

If hypotensive:

FLUID CHALLENGE, if no response Dopamine 2 – 10 mcg/kg/min for HYPOTENSION with Carbon Monoxide

* Intubation should be considered if the victim develops severe respiratory distress.