POISINDEX(R) Toxicologic Management
Topic: ASPHYXIANTS, SIMPLE

0.0 OVERVIEW

0.1 LIFE SUPPORT

This overview assumes that basic life support measures have been instituted.

0.2 CLINICAL EFFECTS

0.2.1 SUMMARY OF EXPOSURE

A. Simple asphyxiants displace oxygen from the breathing atmosphere primarily in enclosed spaces and result in hypoxia. Four stages are described, depending on the arterial oxygen saturation.

1. INDIFFERENT STAGE: %O2 saturation is 90 to 98%; only decreased night vision is noted.
2. COMPENSATORY STAGE: %O2 saturation is 82 to 90%; physiological compensation; little functional decrement, although such may begin in those with pre-existing cardiac, pulmonary or hematologic problems.
3. DISTURBANCE STAGE: %O2 saturation is 64 to 82%; Symptoms: air hunger, fatigue, decreased vision, mood disturbances, numbness of the extremities, headache, confusion, decreased coordination and judgement, and cyanosis.
4. CRITICAL STAGE: %O2 saturation is 60 to 70% or less; deterioration of coordination and judgement may occur in 3 to 5 minutes with unconsciousness following rapidly.

B. All early effects may decrease ability for self-rescue from the toxic environment.

C. Some agents causing asphyxia are stored and transported in compressed or liquid form and can cause frostbite on direct skin contact.

0.2.3 HEENT

A. Decreases in night vision, visual acuity, and visual fields (tunnel vision) may occur.

0.2.4 CARDIOVASCULAR

A. TACHYCARDIA: An increased pulse rate may occur.

B. ARRHYTHMIAS AND ISCHEMIA: Cardiac manifestations of prolonged or severe hypoxia may include atrial or ventricular arrhythmias, hypotension, myocardial ischemia, myocardial infarction, and eventual asystole.

0.2.5 RESPIRATORY

A. HYPERVENTILATION: Hyperventilation may be seen.

B. CYANOSIS: Cyanosis may occur.

0.2.6 NEUROLOGIC

A. NEUROLOGICAL IMPAIRMENT: Various disturbances including headache, dizziness, mood disturbances, numbness of the extremities, sleepiness, mental confusion, poor judgement and coordination, and memory loss may occur.

B. UNCONSCIOUSNESS: Prolonged or severe hypoxia results in unconsciousness.
C. Prolonged asphyxia may produce CNS injury.

0.2.7 GASTROINTESTINAL
A. Nausea, vomiting, and prostration may occur.

0.2.11 ACID-BASE
A. HYPERCAPNIA: Hypercapnia may be seen.

0.2.15 DERMATOLOGIC
A. Dermal exposure may cause frostbite injury.

0.3 LABORATORY
A. Arterial blood gases are useful to assess the degree of hypoxemia.

0.4 TREATMENT OVERVIEW

0.4.1 SUMMARY
A. Move victims from toxic atmosphere and administer 100% humidified supplemental oxygen with assisted ventilation as required. Patients with severe or prolonged exposure should be carefully evaluated for neurologic sequelae. Rewarming and a variety of topical treatments are indicated for frostbite.

0.4.3 INHALATION EXPOSURE
A. Administer 100% humidified supplemental oxygen with assisted ventilation as required.
B. If hypoxia has been severe or prolonged, carefully evaluate for neurologic sequelae and provide supportive treatment as indicated.

0.4.4 EYE EXPOSURE
A. DECONTAMINATION: Exposed eyes should be irrigated with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, lacrimation, or photophobia persist, the patient should be seen in a health care facility.

0.4.5 DERMAL EXPOSURE
A. Rewarming and a variety of topical treatments are indicated for frostbite injury. SEE MAIN SECTION FOR MORE INFORMATION.

0.5 RANGE OF TOXICITY
A. Unconsciousness leading to death will occur when the atmospheric oxygen concentration is reduced to 6 to 8% or less.
B. Signs of asphyxia will be noted when atmospheric oxygen is displaced such that the oxygen concentration is 15 to 16% or less.
C. At increasing altitudes the decreasing atmospheric pressure decreases the partial pressure of oxygen, decreasing the molecules of oxygen available in stipulated percentages.