

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: %O<sub>2</sub> saturation is 90 to 98%; only decreased night vision is noted.
  - 2. COMPENSATORY STAGE: %O<sub>2</sub> 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: %O<sub>2</sub> 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: %O<sub>2</sub> 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.

Topic: ASPHYXIANTS, SIMPLE

- 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.