Methemoglobinemia

METHEMOGLOBINEMIA should be suspected in patients who have been exposed to Nitrogen Oxides. METHEMOGLOBINEMIA can also be induced when treating a patient with Cyanide Poisoning using older antidotes. It is NOT associated with treatment using the Cyanokit®.

FORMS: Gas, liquid and solid. Substances tend to be brown or yellow in color, especially when impure.

ROUTES OF EXPOSURE: Skin and eye, inhalation, ingestion

SIGNS AND SYMPTOMS:

CNS: Fatigue, restlessness and decreasing LOC are usually delayed signs.

Eye: Chemical conjunctivitis.

Cardiovascular: Cardiovascular collapse with a rapid and weak pulse. Reflex bradycardia may occur.

Respiratory: With most agents a mild and transient cough is the only symptom at the time of exposure. A delayed onset of dyspnea, rapid respirations, violent coughing and pulmonary edema follows. Some agents work immediately on the upper airway, resulting in pain and choking, spasm of the glottis, temporary reflex arrest of breathing and cause upper airway obstruction from spasm or edema of the glottis.

Gastrointestinal: Burning of the mucous membranes, nausea, vomiting and abdominal pain.

Skin: Irritation of moist skin areas. Pallor and prominent cyanosis.

Other: With most products, symptoms will be delayed for 5 to 72 hours. Certain products or high concentrations can bring on symptoms immediately. Blood may be a "chocolate brown" color.

Pre-Medical Control
PARAMEDIC

1. Follow **General Hazardous Materials Treatment** protocol.
2. Administer oxygen 10-15 L via non-rebreather mask or BVM.
3. **Aggressive airway management may be necessary!**

Post-Medical Control

In the symptomatic patient with a significant exposure administer treatment in the following order.

1. Methylene Blue 1% solution (10 mg/ml) 1 to 2 mg/kg slow IV push over 5 minutes (equivalent to 0.1 to 0.2 ml/kg, or a total of 5 to 20 ml). Total dose should not exceed 7 mg/kg **in adults or pediatrics.** Observe for elevated BP, nausea, disorientation.
2. Repeat dose in 30 - 60 minutes if cyanosis or severe symptoms persist.
3. Oxygen for at least 2 hours following Methylene Blue administration.

WARNING! Methylene Blue is itself toxic and may produce disorientation, elevated BP, nausea, diarrhea and delayed hemolytic anemia.

Once patient is stable rule out other causes for METHEMOGLOBINEMIA.

SPECIAL CONSIDERATIONS:

Sedative medications may cause further damage and may be contraindicated.

A patient with methemoglobinemia may have SpO2 readings of 85% despite aggressive oxygen administration. In general, SpO2 will drop by approximately ½ of the methemoglobin percentage. For example, when 20% of Hgb is methemoglobin (has oxidized Fe3+ instead of normal Fe2+ the SpO2 may appear to be 10% less than would otherwise be expected. Based on how pulse oximetry works, it will not lower much further than 85%.

Continue to administer 10-15 L/min via NRB or BVM despite SpO2 readings.