

West Michigan MCC
SPECIAL OPERATIONS
CYANIDE EXPOSURE

Date: ~~September 18, 2019~~ January 13, 2020 DRAFT

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Cyanide Exposure

Chemical Agents

1. Agents of Concern Include: Cyanide
 - a. Hydrogen Cyanide
 - b. Potassium / Sodium Cyanide
 - c. Cyanogen Chloride
2. Detection: The presence of these agents can be detected through specialized environmental monitoring equipment available to hazardous materials response teams.
3. Modes of Exposure
 - a. Inhalation (including smoke inhalation)
 - b. Ingestion
 - c. Skin absorption unlikely

Assessment

1. Vital signs with red flag vitals being hypotension SBP <90 mm Hg-
- ~~2.~~ Shortness of breath
 - a. Possibly accompanied by chest pain
 - b. Generally not associated with cyanosis (blue skin membranes)
 - c. Pulse oximetry levels usually normal
 - d. Usually associated with increased respiratory rate and tidal volume
 - e. Potential for rapid respiratory arrest, red flag symptoms being cardiac or respiratory arrest
- ~~2.~~3. Confusion, decreased level of consciousness, coma, assess GCS with red flag being GCS <=9
4. Seizures
- ~~3.~~5. Almond Odor
- ~~4.~~6. Headache, dizziness, vertigo (sense of things spinning)-
- ~~5.~~7. Pupils dilate (late)

Pre-Medical Control

PARAMEDIC

1. Follow the **General Treatment Prehospital Care** protocol.
2. Administer oxygen 10-15 L via non-rebreather mask.
3. **Caution: Responders must protect themselves from secondary contamination due to off-gassing and body fluids.**
4. Transport with good ventilation and appropriate respiratory protection.
5. If in respiratory arrest, follow the **Emergency Airway Procedure**, respiratory arrest is a red flag symptom for possible cyanide exposure. as these patients have been found to respond to antidote therapy and should receive Initiate positive pressure ventilation when operationally feasible.

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6. If there is a presumed exposure and the patient has indications for use, administer CyanoKit if available.
 - a. Indications for use:
 - i. Almond Odor
 - ii. Cardiac or Respiratory Arrest
 - iii. Hypotension SBP <90
 - iv. GCS </=9
 - A. The starting dose of hydroxocobalamin for adults is 5 g (i.e., two 2.5g vials OR one 5g vial) administered as an intravenous (IV) infusion over 15 minutes (approximately 15 ml/min), i.e., 7.5 7.5 minutes/vial. See charts below for pediatric dosing (70 mg/kg).

**Cyanokit® Administration for Suspected Cyanide Poisoning
(including serious smoke inhalation)**

Weight	Age	Cyanokit® Dose ¹ (~70 mg/ml +/-) IV/IO	Cyanokit® Volume to Administer ² IV/IO
3-5 kg (6-11 lbs)	0-2 months	250 mg	10 mL ³
6-7 kg (13-16 lbs)	3-6 months	500 mg	20 mL ³
8-9 kg (17-20 lbs)	7-10 months	625 mg	25 mL ³
10-11 (21-25 lbs)	11-18 months	750 mg	30 mL ³
12-14 kg (26-31 lbs)	19-35 months	900 mg	36 mL ³
15-18 kg (32-40 lbs)	3-4 years	1100 mg	44 mL ³
19-23 kg (41-51)	5-6 years	1500 mg	60 mL ³
24-29 kg (52-64)	7-9 years	1750 mg	70 mL ³
30-36 kg (65-79 lbs)	10-14 years	2500 mg	100 mL ⁴ (1/2 bottle)
Adult 37-40 kg (80-88 lbs)	>14 years	3000 mg	120 mL ⁴
Adult 41-49kg (89-108 lbs)	>14 years	3500 mg	140 mL ⁴
Adult > or = 50 kg (> or = 109 lbs)	>14 years	5000 mg	200 mL ⁴ (full bottle)

¹The safety and efficacy in pediatrics has not been established, ²Administer slowly over 15 minutes.

³Push slowly over 15 minutes, ⁴Infuse over 15 minutes

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- B. Each vial of hydroxocobalamin for injection is to be reconstituted with diluent (not provided with Cyanokit) using the supplied sterile transfer spike.
 - 1. The recommended diluent is 0.9% Sodium Chloride injection (0.9% NaCl).
 - 2. The line on each vial label represents the volume of diluent. Following the addition of diluent to the lyophilized powder, each vial should be repeatedly inverted or rocked, not shaken, for at least 30 seconds for the 2.5g bottles prior to infusion, 60 seconds for the 5g bottles.
 - 3. Hydroxocobalamin solutions should be visually inspected for particulate matter and color prior to administration.
 - a. If the reconstituted solution is not dark red or if particulate matter is seen after the solution has been appropriately mixed, the solution should **not be administered to the patient** and should be discarded.
- C. There are a number of drugs and blood products that are incompatible with Cyanokit, thus Cyanokit requires a separate intravenous line for administration.
- D. Depending upon the severity of the poisoning and the clinical response, a second dose of 5 g may be administered by IV infusion for a total dose of 10g in adults. The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to two hours, as clinically indicated. Contact medical control for second dose instructions for pediatric patients.

SPECIAL CONSIDERATION FOR SMOKE INHALATION:

Many, but not all, smoke inhalation victims will have cyanide poisoning and may present with burns, trauma, and exposure to other toxic substances making a diagnosis of cyanide poisoning particularly difficult. Assess for exposure to fire or smoke in an enclosed area as well as the presence of soot around the mouth, nose or oropharynx. While important to note, these alone are not an indication for Cyanokit treatment.

The Cyanokit should be considered for all serious smoke inhalation victims, especially those with altered mental status (GCS of 9 or less), hypotension (SBP < 90) or cardiac arrest or respiratory arrest without burn criteria for death on scene (incinerated body).

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