Medical Procedures **Date: 02/01/2021**

Cyanide Toxicity Treatment **Policy #7140**

I. Purpose:

A. To establish indications, guidelines, and the standard procedures for administering treatment in patients with suspected cyanide toxicity.

II. Authority:

A. Health and Safety Code, Section 1797.220, 1798. Title 22, Section 100170.

III. Policy:

A. **Hydroxocobalamin, sodium nitrite, and sodium thiosulfate may be administered under the following indications, when clinical suspicion based on history and physical exam provide high concern for cyanide toxicity. These indications include:**
   1. Hypotension not attributed to other obvious cause
   2. Respiratory distress or cyanosis not attributed to other obvious cause
   3. Altered mental status
   4. Coma
   5. Seizures
   6. Respiratory or cardiac arrest

B. Relative contraindications for all:
   1. Pregnancy
   2. Sensitivity to hydroxocobalamin, or B12 related chemicals
   3. Sensitivity to sodium nitrite or sodium thiosulfate

C. Contraindications for sodium nitrite:
   1. Suspected or potential concomitant carbon monoxide toxicity
   2. G6PD deficiency
   3. Significant pre-existing anemia
   4. Congenital methemoglobinemia

D. Absolute contraindications:
   1. Anaphylaxis to hydroxocobalamin, or B12 related chemicals
   2. Anaphylaxis to sodium nitrite or sodium thiosulfate

E. Document the following in the patient care record:
   1. Signs and symptoms indicating need for medication
   2. Base station contact
   3. Suspected complications or side effects from treatment
   4. Response to treatment

F. Documentation:
   1. This protocol is for Local Optional Scope of Practice paramedic who have completed the training
   2. The medication needs to be documented in the medication section and the narrative sections

IV. Procedure:

A. Administration
   1. Scene safety is paramount. ENSURE THERE IS NO ACUTE EXPOSURE RISK TO EMS PERSONNEL
      a. Consider removal of patient clothing and decontamination as needed, prior to patient treatment

2. Assess airway and breathing per protocol
   a. If high concern for cyanide toxicity and/or carbon monoxide toxicity, administer oxygen 15 L NRB
3. Treat respiratory and/or cardiac symptoms per appropriate protocol
4. Begin continuous ECG, pulse oximetry, and end tidal CO2 monitoring
   a. Pulse oximetry monitors may give falsely elevated readings in patients exposed to cyanide, carbon monoxide or methemoglobinemia
5. Establish 2 large bore IV lines
6. **PREFERRED: Administer hydroxocobalamin**
   a. Mild Exposure
      i. Patients with suspected prolong exposure to cyanide
      ii. No vital sign or physical exam abnormalities
      iii. Contact Medical Control for medication administration approval
      iv. Administer hydroxocobalamin (0.7 mg/kg up to 5 grams) IV piggyback over 15 minutes.
      v. Transport to appropriate facility
         a) Consider direct transport to burn center if appropriate (see Air Ambulance and Trauma Triage Protocols)
   b. Moderate to Severe Exposure
      i. Patients with suspected exposure to cyanide
      ii. Present with confusion, disorientation, altered mental status, LOC, coma, hypotension, respiratory or cardiac arrest
      iii. Standing order for medication administration
      iv. Administer hydroxocobalamin (0.7 mg/kg up to 5 grams) IV piggyback over 15 minutes.
      v. If hypotensive, consider NS 1000 ml bolus
   c. If the IV infiltrates the paramedic can restart a new IV and continue the infusion
      i. Patients should have two IVs during cyanide treatments
   d. If patient develops signs or symptoms of an allergic reaction or anaphylactic reaction:
      i. Immediately stop the infusion
      ii. Disconnect infusion
      iii. Follow the standing orders for allergic reaction, anaphylaxis, and/or shock
      iv. Notify Base Station of the allergic reaction or anaphylaxis
      v. Notify receiving and sending hospitals of reaction at completion of transport
   e. Treat other presenting symptoms as per protocol
   f. Give the receiving facility as much notice as possible that the hydroxocobalamin has been started and is being administered
7. If hydroxocobalamin is not available, and **there is no clinical suspicion for carbon monoxide poisoning**, administer sodium nitrite AND sodium thiosulfate
   a. Mild Exposure
      i. Patients with suspected prolong exposure to cyanide
      ii. No vital sign or physical exam abnormalities
      iii. Contact Medical Control for medication administration approval

iv. Administer sodium nitrite (6 mg/kg up to 300 mg) IV over 5 minutes AND sodium thiosulfate (400 mg/kg up to 12.5 grams) IV piggyback over 10 minutes
v. Transport to appropriate facility
a) Consider direct transport to burn center if appropriate (see Air Ambulance and Trauma Triage Protocols)

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ix. Notify Base Station of the allergic reaction or anaphylaxis
x. Notify receiving and sending hospitals of reaction at completion of transport

j. Treat other presenting symptoms as per protocol
k. Give the receiving facility as much notice as possible that sodium nitrite and sodium thiosulfate have been started and are being administered

V. Adverse Reactions:

A. Adverse effects are uncommon. Red discoloration of the skin, mucous membranes, and urine occur in most patients.
B. Transient hypertension may appear at the end of infusion, however no intervention required.
C. Infusion site reaction – redness or swelling. Requires confirmation of IV placement and patency.
D. Due to possible complications and non-compatible medications, these medications should be given through a dedicated IV line.
E. **Patient's skin may turn blue if they develop methemoglobinemia. Stop infusion immediately of sodium nitrite. Continue with sodium thiosulfate.**

VI. Quality Assurance:

1. All IV hydroxocobalamin, sodium nitrite and sodium thiosulfate administrations will undergo review by provider agency, the Imperial County EMQAAR committee and standard data elements shall be reported
2. The provider agencies shall review 100% of these cases each month

3. Submit any adverse outcomes to the EMS agency immediately within 48 hours
4. The provider agencies need to submit quarterly summary report to the EMS agency

APPROVED:

Signature on File
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