

**REGION I EMERGENCY MEDICAL SERVICES
STANDING MEDICAL ORDERS
BLS**

SMO: Hydrofluoric Acid

Revised Date:

Overview: Hydrofluoric acid (HF) is a relatively weak acid because the hydrogen and fluoride create a tightly bound molecule. HF readily penetrates the skin and mucous membranes because of its tight binding (uncharged). In the tissue, the fluoride portion will avidly bind to divalent cations such as calcium and magnesium causing deep tissue destruction. The deep tissue destruction causes the severe unrelenting pain experienced by affected patients. Severity and timing of effects depends on the concentration, duration of exposure, and penetrability of the exposed tissue; pain may be delayed. Life threatening systemic toxicity may follow dermal exposure with minimal external tissue damage.

Timing of pain following dermal exposure to HF will vary according to concentration. Generally:

- **<20 percent concentration – skin redness and pain may be delayed for 24 hours and often is not reported until significant tissue injury has occurred**
- **20 to 50 percent concentration – skin redness and pain may be delayed for 8 hours and often is not reported until tissue injury has occurred**
- **>50 percent concentration – may produce immediate pain and skin redness, rapid destruction of tissues and acute systemic toxicity**

INFORMATION NEEDED

- ___ History of illness
- ___ Exposure to liquids that are not known to the patient
- ___ Duration of any exposure
- ___ Concentration of liquid

OBJECTIVE FINDINGS

- ___ • **Airway:** Upper airway and mucosal irritation may occur from fumes
- ___ • **Cardiovascular:** Hypocalcemia and hypomagnesemia are associated with prolonged QTc and ventricular dysrhythmias, such as torsades de pointes, ventricular tachycardia and ventricular fibrillation
- ___ • **Pulmonary:** Dyspnea, bronchospasm chemical pneumonitis, pulmonary edema (possibly hemorrhagic), tracheobronchitis, upper airway obstruction, chemical burns (larynx, trachea and bronchi) and ARDS may occur following severe inhalational exposure
- ___ • **Metabolic:** Hypocalcemia, hypomagnesemia, hyperkalemia and acidosis
- ___ • **Dermal:** A hallmark of dermal exposure to low concentrations of HF is pain that is out of proportion to the physical examination. Severe pain may be obvious, while only redness of the exposed skin is observed. More severe burns may exhibit skin redness, central blanching with peripheral skin redness, swelling, vesiculation, serious crusting, ulceration, blue-gray discoloration and skin death
- ___ • **Eyes:** Pain, conjunctival injection, corneal abrasion and corneal ulceration may be seen initially with a strong liquid exposure. Progressive corneal vascularization, scarring and corneal opacification may occur in a delayed fashion

BLS

- ___ Scene safety is of the utmost importance for the EMS personnel
- ___ Decontaminate all exposed clothing and jewelry and irrigate all exposed areas with copious amounts of water, a minimum of 30 minutes for acute exposures
- ___ Assess for medical and trauma issues
- ___ Provide supplemental oxygenation via nasal cannula at 2-6 LPM or by non-rebreather mask at 10-15 LPM
- ___ Ensure patency of the patient's airway
- ___ Treat burns
- ___ Call for BLS, ILS or ALS support
- ___ Albuterol nebulizer treatment may be needed based upon the patient's clinical presentation

Documentation of adherence to protocol:

- ___ Decontamination procedures used
- ___ Oxygen provided
- ___ Airway maneuvers required
- ___ Medications administered

Medical Control Contact Criteria

- ___ • Contact Medical Control as soon as possible. ILS and/or ALS support will be needed for this type of patient.
- ___ • Contact Medical Control prior to administering Albuterol

**REGION I EMERGENCY MEDICAL SERVICES
STANDING MEDICAL ORDERS
ALS**

SMO:

Revised Date:

Overview: Hydrofluoric acid (HF) is a relatively weak acid because the hydrogen and fluoride create a tightly bound molecule. HF readily penetrates the skin and mucous membranes because of its tight binding (uncharged). In the tissue, the fluoride portion will avidly bind to divalent cations such as calcium and magnesium causing deep tissue destruction. The deep tissue destruction causes the severe unrelenting pain experienced by affected patients. Severity and timing of effects depends on the concentration, duration of exposure, and penetrability of the exposed tissue; pain may be delayed. Life threatening systemic toxicity may follow dermal exposure with minimal external tissue damage.

Timing of pain following dermal exposure to HF will vary according to concentration. Generally:

- **<20 percent concentration – skin redness and pain may be delayed for 24 hours and often is not reported until significant tissue injury has occurred**
- **20 to 50 percent concentration – skin redness and pain may be delayed for 8 hours and often is not reported until tissue injury has occurred**
- **>50 percent concentration – may produce immediate pain and skin redness, rapid destruction of tissues and acute systemic toxicity**

INFORMATION NEEDED

- ___ History of illness
- ___ Exposure to liquids that are not known to the patient
- ___ Duration of any exposure
- ___ Concentration of liquid

OBJECTIVE FINDINGS

- ___ • **Airway:** Upper airway and mucosal irritation may occur from fumes
- ___ • **Cardiovascular:** Hypocalcemia and hypomagnesemia are associated with prolonged QTc and ventricular dysrhythmias, such as torsades de pointes, ventricular tachycardia and ventricular fibrillation
- ___ • **Pulmonary:** Dyspnea, bronchospasm chemical pneumonitis, pulmonary edema (possibly hemorrhagic), tracheobronchitis, upper airway obstruction, chemical burns (larynx, trachea and bronchi) and ARDS may occur following severe inhalational exposure
- ___ • **Metabolic:** Hypocalcemia, hypomagnesemia, hyperkalemia and acidosis
- ___ • **Dermal:** A hallmark of dermal exposure to low concentrations of HF is pain that is out of proportion to the physical examination. Severe pain may be obvious, while only redness of the exposed skin is observed. More severe burns may exhibit skin redness, central blanching with peripheral skin redness, swelling, vesiculation, serious crusting, ulceration, blue-gray discoloration and skin death
- ___ • **Eyes:** Pain, conjunctival injection, corneal abrasion and corneal ulceration may be seen initially with a strong liquid exposure. Progressive corneal vascularization, scarring and corneal opacification may occur in a delayed fashion

ALS

- ___ Scene safety is of the utmost importance for the EMS personnel
- ___ Decontaminate all exposed clothing and jewelry and irrigate all exposed areas with copious amounts of water, a minimum of 30 minutes for acute exposures
- ___ Assess for medical and trauma issues
- ___ Provide supplemental oxygenation via nasal cannula at 2-6 LPM or by non-rebreather mask at 10-15 LPM
- ___ Ensure patency of the patient's airway
- ___ Treat burns
- ___ Albuterol nebulizer treatment may be required for bronchospasm
- ___ Cardiac monitor
- ___ Morphine may be required as an analgesic for the patient's pain

Documentation of adherence to protocol:

- ___ Decontamination procedures used
- ___ Oxygen provided
- ___ Airway maneuvers required
- ___ Medications provided
- ___ Cardiac rhythm strip

Medical Control Contact Criteria

- ___ • Contact Medical Control prior to providing an Albuterol nebulizer treatment