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
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
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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