

Oakland County Medical Control Authority
System Protocols – Hazardous Materials Medical Response Team
HYDROGEN FLUORIDE

Date: September 2022

Section 11-9

Hydrogen Fluoride

Hydrogen Fluoride (Fluoric acid, Hydrofluoric acid, Fluorine monohydride, ammonium bifluoride)

FORMS: Gas, liquid. (Fluoride salts in the presence of acids may generate Hydrogen Sulfide) Metal cleaners and tire rim cleaners.

ROUTES OF EXPOSURE: Skin and eye, inhalation, ingestion.

SIGNS AND SYMPTOMS:

- CNS:** Symptoms of hypoxia, stupor, lethargy and coma.
- Eye:** Chemical conjunctivitis, opacification of the cornea and blindness.
- Cardiovascular:** Hypovolemic shock and circulatory collapse. Tachycardia with weak pulse. Dysrhythmias related to hypocalcemia. Hyperkalemic arrhythmias.
- Respiratory:** Acute pulmonary edema, asphyxia and chemical pneumonitis. Upper airway obstruction with stridor, pain and cough due to edema.
- Gastrointestinal:** Acute toxicity results in burns to the mouth, esophagus, stomach and lower G.I. tract. Nausea, vomiting and diarrhea, possibly containing blood.
- Skin:** Severe pain with normal looking skin surface. Burn is in lower skin layers. Bone may be involved. Damage may be severe with no outward signs, except patient will complain of intense pain.
- Other:** Hydrogen fluoride will form hydrofluoric acid upon contact with water, such as in the respiratory system. It binds with the calcium in bones and cause **extreme** pain. Both hypocalcemia and hyperkalemia can be associated with cardiac complications.

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Pre-Medical Control

PARAMEDIC

1. Follow **General HazMat Treatment** protocol.
2. Dysrhythmias may be treated with IV injections of Calcium Gluconate 1 gm of 10% solution IVP in flushed line. Repeat if dysrhythmia persists.
3. In addition to Calcium Gluconate treatment, pain may also be treated per the **Pain Management Procedure**.

Inhalation Exposure

1. Add 5ml Calcium Gluconate 10% to 20ml sterile water. Use 5ml for nebulizer. Repeat as needed.
2. Consider CPAP to improve ventilation if needed

Eye Exposure

1. Follow **HAZMAT Eye Irrigation** protocol.
2. Remove contact lenses if present.
3. Irrigate with a 1% aqueous solution of Calcium Gluconate (50ml of 10% Calcium Gluconate in 450 ml of NS).
4. Continue irrigation with NS until arrival at the hospital or directed by medical control.

Skin Exposure

1. Large volume irrigation may be necessary.
2. Prepare a Calcium Gluconate gel by mixing 1 amp of 10% Calcium Gluconate per ounce of K-Y jelly.
3. Apply the gel to burned areas. Apply an occlusive dressing over the gel.

Ingestion Exposure

1. Do not induce emesis or administer Activated Charcoal.
2. If patient is alert and able to swallow give 4-8 oz. of water.
3. Treat dysrhythmias according to appropriate protocol in addition to the Calcium Gluconate.

Post-Medical Control

1. Medical Control may also order Magnesium Sulfate for treatment of dysrhythmias.

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SPECIAL CONSIDERATIONS:

Pain relief is usually used as an end point for Calcium Gluconate treatment.

The patient who has a significant exposure and is experiencing severe complications has a very poor prognosis. Treatment should be geared towards calcium replacement and care should be given to prevent the possibility of secondary contamination.

Hyperkalemia presents initially with peaked T-waves and may progress to widening of the complex, with either tachy or bradyarrhythmias.

Hypocalcemia produces Q-T prolongation, which can progress into frank arrhythmias.