BASF Chemical Emergency Medical Guidelines

Hydrogen chloride (HCl); Hydrochloric Acid A 1

Information and recommendations for first responders

- **Before approaching the patient, the first responder must make sure that he does not risk exposing himself to hydrogen chloride.**
- **Patients exposed only to hydrogen chloride gas (boiling point –85°C, -121°F, respectively) do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with hydrochloric acid can cause secondary contamination of rescue and medical personnel by direct contact or through off-gassing hydrogen chloride.**
- **Hydrogen chloride gas is rapidly corrosive when it comes in contact with moist tissue such as the eyes, skin, and upper respiratory tract causing eye irritation, coughing, chest pain and dyspnea. Swelling of the throat and accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) may occur.**
- **There is no antidote to be administered to counteract the effects of hydrogen chloride. Treatment consists of supportive measures.**

1. Substance information

Hydrogen chloride (HCl), CAS 7647-01-0
Synonyms: anhydrous hydrochloric acid, hydrochloric acid gas
At room temperature hydrogen chloride is a colorless gas with a sharp or pungent odor. Under pressure or at temperatures below –85°C (-121°F), it is a clear liquid. On exposure to air dense white vapor is formed, due to condensation with atmospheric moisture. In contact with moisture, it forms hydrochloric acid. The vapor formed is corrosive.
Hydrogen chloride is available as anhydrous gas or aqueous solution (hydrochloric acid). Aqueous solutions are usually colorless but may be yellow due to trace impurities. Hydrogen chloride is widely used in chemical processes and production.

2. Routes of exposure

Inhalation

Most exposures occur by inhalation. Hydrogen chloride's odor and upper respiratory irritant properties generally provide adequate warning of hazardous concentrations. Hydrogen chloride is heavier than air and may cause asphyxiation in poorly ventilated, low-lying, or enclosed spaces.

Skin/eye contact

Direct contact with liquid hydrogen chloride or concentrated gas on wet or moist skin causes severe chemical burns. It is poorly absorbed through the skin.

Ingestion

Ingestion of hydrogen chloride is unlikely because it is a gas at room temperature. Aqueous solutions (hydrochloric acid) cause severe corrosive injury if ingested.

3. Acute health effects

Respiratory	**Hydrogen chloride exposure usually causes sore throat, and coughing**. Rapid development of respiratory distress with chest pain, dyspnea, swelling of the throat and accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) may occur. Lung injury may progress over several hours. Hydrogen chloride poisoning may cause respiratory failure.
Dermal	Deep burns of the skin and mucous membranes may be caused by contact with concentrated hydrochloric acid; disfiguring scars may result. Contact with less concentrated hydrogen chloride gas or hydrochloric acid mist can cause burning pain, redness, inflammation, and blisters. Contact with liquid hydrogen chloride under pressure can result in frostbite.
Ocular	Low gas concentrations cause burning discomfort, spasmodic blinking or involuntary closing of the eyelids, redness, and tearing. Corneal burns, cataracts and glaucoma may occur from exposure to high concentrations.

4. Actions

Rescuer self-protection	**If the zone which has to be entered by the rescuer is suspected of containing hydrogen chloride, pressure-demand, self-contained breathing apparatus and chemical-protective clothing shall be worn**; **do not use equipment that is contaminated itself.** Patients exposed only to hydrogen chloride gas do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with liquid hydrogen chloride may secondarily contaminate rescue and medical personnel by direct contact or through off-gassing hydrogen chloride.
Patient recovery	Patients should be removed from the contaminated zone immediately. Patients who are unable to walk may be removed on backboards or stretchers; if these are not available, carefully remove/transport patients with appropriate action to a safe zone, taking into account your self-protection. Immediate priorities must follow the "**A, B, C's**" of resuscitation: **A) Airway** (make sure the airway is not blocked by the tongue or a foreign body) **B) Breathing** (check to see if the patient is breathing, provide ventilations with use of appropriate barrier devices, e.g. with a pocket face mask, if breathing is absent) **C) Circulation** (start CPR in any unresponsive person with absent or abnormal breathing)
Decontamination	Patients exposed only to hydrogen chloride gas who have no evidence of skin or eye irritation do not need decontamination. All others require decontamination. Patients who are able and cooperative may assist with their own decontamination. If the exposure involved liquid hydrogen chloride and if clothing is contaminated, remove and double-bag the clothing. **Irrigate exposed or irritated eyes with plain water or saline for at least 20 minutes**. Remove contact lenses if present and easily removable without additional trauma to the eye. Continue other basic care during flushing. **Flush exposed skin and hair with plain water for at least 15 minutes**. Protect eyes during flushing of skin and hair. Continue other basic care during flushing.
Further actions	**Each potentially exposed person should seek immediate medical advice and treatment.**

In this document BASF has made a diligent effort to ensure the accuracy and currency of the information presented but makes no claim that the document comprehensively addresses all possible situations related to this topic. This document is intended as an additional resource for first responders in assessing the condition and managing the treatment of patients exposed to hydrogen chloride. It is not, however, a substitute for the judgement of a first responder and must be interpreted in the light of specific information regarding the patient available to such a first responder and in conjunction with other sources of authority.

BASF SE
Corporate Health Management
Carl-Bosch-Straße 38
67056 Ludwigshafen
Germany

BASF Corporation
Medical Department
100 Campus Drive, M/S F 221
Florham Park, NJ 07932
USA

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