BASF Chemical Emergency Medical Guidelines

Nitric acid (HNO_3) A 1

Information and recommendations for first responders

- **Patients whose clothing or skin is contaminated with nitric acid can cause secondary contamination of rescue and medical personnel by direct contact or by release of nitric acid vapor or fumes.**
- **Nitric acid and its vapor or fumes are rapidly corrosive when they come in contact with tissues such as the eyes, skin, and upper respiratory tract causing irritation, burns, coughing, chest pain and dyspnea. Swelling of the throat and accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) may occur.**
- **Ingestion of nitric acid can cause severe corrosive injury to the lips, mouth, throat, esophagus, and stomach.**
- **There is no antidote to be administered to counteract the effects of nitric acid. Treatment consists of supportive measures.**

1. Substance information

Nitric acid (HNO_3), CAS 7697-37-2
Synonyms: hydrogen nitrate
At room temperature nitric acid is a colorless to yellow or brownish-red liquid with a choking odor. The color is due to the release of oxides of nitrogen, especially nitrogen dioxide, into the air upon exposure to light. Depending on environmental factors the vapor or fumes of nitric acid may actually be a mixture of various oxides of nitrogen and nitric acid, even at temperatures well below the boiling point of 83°C (181°F). Nitric acid may be formed in photochemical smog from the reaction between nitric oxide and hydrocarbons.
Nitric acid itself is nonflammable, but it can increase the flammability or cause the spontaneous combustion of other materials. It is soluble in water.
Nitric acid is used in the manufacture of fertilizers, gunpowder and explosives, pesticides, dyestuffs, and pharmaceuticals, especially in the manufacture of organic and inorganic nitrates. It is also used for etching and cleaning of metals, and electroplating.

2. Routes of exposure

Inhalation

Nitric acid's odor and irritant properties generally provide adequate warning of acutely hazardous concentrations.

Skin/eye contact

Direct contact with liquid nitric acid or concentrated vapor or fumes on wet or moist skin causes severe chemical burns. Nitric acid is poorly absorbed through the skin.

Ingestion

Ingestion of nitric acid can cause severe corrosive injury to the lips, mouth, throat, esophagus, and stomach**.**

3. Acute health effects

Respiratory

Nitric acid exposure usually causes dryness of the nose and throat, and coughing. Inhalation of very high concentrations may result in swelling of the throat and eventually in obstruction of the airways and death. Development of respiratory distress with chest pain, dyspnea and accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration) may occur after a delay of up to 24 hours.

Skin contact

Deep burns of the skin and mucous membranes may be caused by contact with concentrated nitric acid; sometimes yellowing of the skin results. Contact with less concentrated nitric acid vapor or fumes can cause burning pain, redness, and inflammation.

Eye contact	Severe eye burns with clouding of the surface, perforation of the globe, and ensuing blindness may occur from exposure to liquid nitric acid. Low concentrations of vapor or fumes cause burning discomfort, spasmodic blinking or involuntary closing of the eyelids, redness, and tearing.

4. Actions

Rescuer self-protection	**If the zone which has to be entered by the rescuer is suspected of containing nitric acid, pressure-demand, self-contained breathing apparatus and chemical-protective clothing shall be worn; do not use equipment that is contaminated itself.** Patients whose clothing or skin is contaminated with nitric acid may secondarily contaminate rescue and medical personnel by direct contact or nitric acid vapor or fumes.
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 ventilation 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	All patients exposed to nitric acid require decontamination. Patients who are able and cooperative may assist with their own decontamination. If the exposure involved liquid nitric acid 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	In case of ingestion of nitric acid, **do not induce emesis. Each potentially exposed person should seek immediate medical advice and treatment.**

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