Chemical Emergency Medical Guideline

Information and recommendations for first responders and patients

Acrylonitrile

CAS No: 107-13-1

GHS symbols:

GHS05
Corrosive

GHS06
Acute toxicity

GHS08
Health hazard

Signal word: Danger

Hazard statements:

H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H315	Causes skin irritation.
H317	May cause allergic skin reactions.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H350	May cause cancer.

Overview

- There is no danger from contact with patients who have only been exposed to acrylonitrile gas. However, a patient who is wet with liquid acrylonitrile (boiling point 77°C) or whose clothing is contaminated with it may endanger other people through direct contact or through acrylonitrile gas emissions. The smell of acrylonitrile does not serve as a clear warning.
- Acrylonitrile irritates the skin, eyes and respiratory tract. It is readily absorbed through the respiratory tract, gastrointestinal tract and intact skin and can lead to general symptoms of poisoning such as shortness of breath, fatigue, loss of consciousness, cardiac arrhythmia, drop in blood pressure and jaundice.
- Symptomatic treatment and immediate administration of oxygen. The administration of a specific antidote (N-acetylcysteine after inhalation exposure or 4-DMAP after oral ingestion) should be considered.

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1. Information about the substance

Acrylonitrile (CH_2=CH-CN), CAS 107-13-1
Synonyms: vinyl cyanide, propene nitrile
At room temperature (boiling point 77°C), acrylonitrile is a clear, slightly yellowish, volatile and flammable liquid with an unpleasant odor. Acrylonitrile is only slightly soluble in water, but highly soluble in many organic solvents.
Acrylonitrile is used in the production of acrylic fibers, plastics and adhesives. These fibers and plastics are used in the manufacture of clothing, furniture, building materials, food packaging and in the automotive industry.

2. Exposition

2.1. Inhalation

Inhalation is the main route of exposure to acrylonitrile. The odor of acrylonitrile does not serve as a clear warning. The sense of smell quickly becomes dull. Since acrylonitrile is heavier than air, there is a risk of suffocation in poorly ventilated, low-lying or enclosed spaces.

2.2. Skin/eye contact

High concentrations or liquid acrylonitrile are easily absorbed through the skin and can lead to general symptoms of poisoning.

2.3. Ingestion

Ingestion of acrylonitrile leads to serious symptoms of poisoning; fatalities are possible.

3. Acute health effects

Acrylonitrile can cause general symptoms of poisoning such as shortness of breath, tightness in the chest, headaches, fatigue, cramps, loss of consciousness, cardiac arrhythmia, drop in blood pressure and jaundice via all routes of exposure. The toxicity of acrylonitrile may be due to the release of hydrocyanic acid during metabolism and to the toxicity of acrylonitrile itself. Symptoms may occur with a delay of up to 12 hours.

Acrylonitrile irritates the upper respiratory tract. It can cause sneezing, nasal discharge, tightness, coughing, shortness of breath and gasping for air.

Local exposure to high concentrations or liquid acrylonitrile can cause severe irritation of the skin and eyes, with tearing and corneal damage.

In most cases, exposure to acrylonitrile occurs through inhalation of the gas. High concentrations and liquid acrylonitrile are easily absorbed through the skin. In addition to irritation of the skin, eyes and respiratory tract, shortness of breath, tightness in the chest, headaches, dizziness, cramps, cardiac arrhythmia, drop in blood pressure and jaundice may occur. Hydrocyanic acid may form in the body.

A single, short-term exposure to acrylonitrile, from which the affected person recovers quickly, does not normally cause delayed or lasting damage to health. Exposure to larger quantities can cause brain and liver damage.

4. Measures

4.1. Self-protection for first aiders

If there is suspicion that the area the helper must enter contains acrylonitrile, a self-contained breathing apparatus and a chemical protection suit must be worn. Contaminated equipment should not be used. There is no danger from contact with patients who have only been exposed to acrylonitrile gas.
A patient who is wet with liquid acrylonitrile or whose clothing is wet with liquid acrylonitrile may endanger other people through direct contact or through acrylonitrile gas emissions.

4.2. Rescue

Patients should be removed from the danger zone immediately. If they are unable to walk unaided, they should be removed from the danger zone quickly using appropriate means, taking care to protect themselves. The "A, B, C procedure" has absolute priority in this case.

A) Clear the airways (check for blockages caused by the tongue or foreign objects)
B) Ventilation (check the patient's breathing; if necessary, begin ventilation with adequate self-protection, e.g. breathing mask)
C) Circulation (begin resuscitation for any person who does not respond to verbal commands and is not breathing normally)

4.3. Cleaning

Patients who have only been exposed to gaseous acrylonitrile and show no signs of skin or eye irritation do not require any special cleaning measures, unlike all others. If possible, patients should assist with their own cleaning. If liquid acrylonitrile has been exposed and clothing is contaminated, it must be removed and securely wrapped.
Rinse affected skin and hair with water for at least 15 minutes. Protect eyes while rinsing. Continue other important emergency measures in the meantime.
If the eyes have been exposed to acrylonitrile or if there is eye irritation, rinse with water or neutral saline solution for at least 15 minutes. Remove any contact lenses, if possible, without additional risk to the eye. Continue other important first aid measures during this time.

4.4. Further measures

Speed is crucial. If the patients show signs of poisoning, treat them with 100% oxygen and obtain and prepare the antidotes for use. Treatment should be carried out simultaneously with cleaning.

Anyone who may have been exposed to acrylonitrile should seek medical attention immediately.

4.5. Instructions for further rules of conduct

Consult your family doctor or the emergency department of the nearest hospital if any abnormalities or symptoms occur within the next 24 hours, in particular:

- Coughing, wheezing or whistling breath
- Difficulty breathing or shortness of breath
- Increased pain or abnormalities in the affected skin areas or eyes
- Pain or tightness in the chest
- Cardiac arrhythmia

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