Chemical Emergency Medical Guideline

Information and recommendations for first responders and patients

Ethylene glycol

CAS No.: 107-21-1

GHS symbols:

GHS07
Acute toxicity

GHS08
Health hazard

Signal word: Warning

Hazard statements:

H302	Harmful if swallowed.
H373	May cause damage to organs (kidneys) through prolonged or repeated exposure.

Overview

- There is no danger from contact with patients who have been exposed to ethylene glycol or who have swallowed ethylene glycol.
- Ingestion of 30ml of ethylene glycol can cause severe poisoning, in particular severe impairment of the central nervous system. A dose of approximately 100ml of ethylene glycol can be fatal.
- Ethylene glycol can cause mild irritation after contact with the eyes, skin and upper respiratory tract, which can manifest itself in redness of the eyes and tearing, coughing, and degreasing and inflammation of the skin.
- Inhalation of vapor/aerosol or ingestion of the liquid can lead to severe systemic poisoning. Absorption through the intact skin is low.
- Ethylene glycol poisoning can be treated by administering ethanol. If the patient is conscious after ingesting ethylene glycol, an adult should immediately consume alcoholic beverages, e.g. 150ml of whisky or brandy.

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1. Information about the substance

Ethylene glycol ($HOCH_2CH_2OH$), CAS 107-21-1
Synonyms: 1,2-dihydroxyethane, 1,2-ethanediol, 2-hydroxyethanol
At room temperature, ethylene glycol is a colorless, odorless and hygroscopic liquid (boiling point 198°C). It is highly soluble in water, ethanol and acetone, slightly soluble in ether and insoluble in oils and halogenated hydrocarbons.
Ethylene glycol is widely used as a solvent, antifreeze and hydraulic fluid, as a plasticizer and drying agent, and as an intermediate product in the chemical industry.

2. Exposition

2.1. Inhalation

Ethylene glycol is readily absorbed through the respiratory tract, but the risk is low due to its low volatility. It can be inhaled as an aerosol or vapor from hot products containing ethylene glycol.

2.2. Skin/eye contact

Ethylene glycol may cause slight irritation to the skin and eyes. Absorption of Ethlene glycol through the intact skin is low.

2.3. Ingestion

Ingestion of ethylene glycol causes severe systemic poisoning. It is readily absorbed into the body from the gastrointestinal tract.

3. Acute health effects

Ingestion of ethylene glycol can lead to severe metabolic acidosis with impairment of the central nervous system, cardiovascular failure and acute renal failure. 100ml can be fatal. The onset of severe symptoms of poisoning may be preceded by a symptom-free period of one to four hours. Drowsiness, high blood pressure, rapid pulse and loss of consciousness are typical signs of poisoning.
Ethylene glycol can cause mild irritation after contact with the eyes, skin and upper respiratory tract, which can manifest itself in redness of the eyes and tearing, coughing, and degreasing and inflammation of the skin. Ethylene glycol poisoning can be treated by inhibiting the formation of toxic degradation products through the administration of 4-methylpyrazole or ethanol.

A single, short-term exposure to low levels of ethylene glycol, from which the affected person recovers quickly, does not normally cause delayed or lasting damage to health.
Prompt treatment usually prevents permanent damage, even in cases of severe poisoning. Severe exposure to ethylene glycol can cause permanent damage to the central nervous system.

4. Measures

4.1. Self-protection for helpers

There is no danger from patients who have been exposed to ethylene glycol. Direct contact with ethylene glycol-contaminated objects or the patient's skin and clothing should nevertheless be avoided.

4.2 Rescue

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

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 ethylene glycol vapors 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 cleansing. If liquid ethylene glycol has been exposed to 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 supportive measures during this time.
If the eyes have been exposed to ethylene glycol or if there is eye irritation, rinse with water or neutral saline solution for 15 minutes. Remove any contact lenses, if possible, without causing additional danger to the eye. Continue other important first aid measures during this time.
Anyone who has been exposed to ethylene glycol vapors or has swallowed liquids containing ethylene glycol should seek medical attention immediately.

4.4. Further measures

Do not induce vomiting after ingestion. Anyone who has swallowed ethylene glycol should seek medical attention immediately. Adults who are fully conscious should immediately consume approximately 0.7g of ethanol/kg of body weight in the form of alcoholic beverages, e.g. by drinking 150ml of whisky or brandy.

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:

- Fatigue, agitation, nausea, vomiting
- rapid pulse, breathing difficulties
- Reduced urine output

5. References

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