
Information and recommendations for paramedics and doctors at the site

- Patients whose clothing or skin is contaminated with phenol can secondarily contaminate rescue and medical personnel, by direct contact or through evaporation of phenol.
 - Phenol is a highly corrosive chemical which is very well and rapidly absorbed by all exposure routes. Thus, phenol can cause severe burns at the contact site as well as systemic poisoning resulting in central nervous system disturbances, cardiovascular and renal failure.
 - Extensive local damage may be caused before pain is felt.
 - Rapid decontamination by immediate extensive irrigation with polyethylene glycol and water is the most critical measure after dermal exposure.
 - There is no systemic antidote to be administered to counteract the effects of phenol. Treatment consists of supportive measures.
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1. Substance information

Phenol (C₆H₅OH), CAS 108-95-2

Synonyms include carbolic acid, hydroxybenzene, phen(yl)ic acid, phenyl(ic) alcohol

At room temperature, phenol has a low vapor pressure and is a clear or light-pink crystalline mass, white powder, or thick liquid. Phenol is well soluble in alcohol and slightly soluble in water. It has a sweet, sharp odor.

Phenol is obtained by organic synthesis or fractional distillation of coal tar. It is used in the manufacture of a variety of products including artificial resins, plastics, photographic developers, rubber, and dyes. Phenol is a general disinfectant and also, in dilute solutions, is used as a preservative, an antipruritic or a local anesthetic in some medical preparations.

2. Routes of exposure

Inhalation

Inhaled phenol is rapidly and significantly absorbed from the lungs, leading to systemic toxicity. However, because of its low volatility, inhalation hazard at room temperature is limited. Phenol's odor usually provides an adequate warning of hazardous concentrations.

Skin/eye contact

Skin contact is the major route of toxic phenol exposures. Phenol vapor and liquid are absorbed very well and rapidly through the skin and eyes and cause systemic toxicity. If more than 100 cm² (15 square inches) of skin are affected, there is risk of imminent death. Even dilute solutions (<2%) may cause severe skin or eye burns if contact is prolonged.

Ingestion

Accidental ingestion of phenol may occur and rapidly lead to severe systemic toxicity. Deaths in adults have been described after ingestion of 1 g or more.

3. Acute health effects

At all sites of oral, esophageal, dermal, or ocular contact, phenol can cause severe burns with irreversible tissue destruction. Serious inhalation exposure may result in upper respiratory tract irritation, swelling, ulceration and pulmonary edema.

Systemic poisoning by any route may result in CNS stimulation with nausea, headache, dizziness, and seizures, followed rapidly by CNS depression with loss of consciousness, respiratory depression, and coma.

Hemolysis and cardiovascular symptoms such as tachycardia, arrhythmias and hypotension may occur and impair oxygen transport. Serious phenol exposure may cause acute renal failure. Vomiting and diarrhea commonly occur after significant phenol exposure by any route.

4. Actions

Rescuer self-protection

If the zone which has to be entered by the rescuer is suspected of containing phenol in response situations that involve exposure to phenol vapor or contact with liquid phenol, pressure-demand, self-contained breathing apparatus and chemical-protective clothing shall be worn.

Patients whose clothing or skin is contaminated with phenol may secondarily contaminate rescue and medical personnel, by direct contact or through evaporation of phenol. Exposure to high concentrations of phenol vapor may cause absorption of phenol onto clothing; caution should be exercised in decontamination.

Patient recovery

Patients should be removed from the contaminated zone immediately. If patients can walk, they should walk. Patients who are unable to walk may be removed on backboards or stretchers; if these are not available, carefully carry or drag patients to safety.

Immediate priorities must follow the "A, B, C's" (Airway, Breathing, Circulation) of resuscitation.

„CRASH“-Decontamination

- Rescue with phenol contaminated, unconscious patients or patients who are unable to move (critically ill/injured patients according to the ABCDE approach) from the danger zone immediately. The use of appropriate personal protective equipment and self-protection have top priority
- Start Basic Life Support if necessary (e.g. bleeding control with Tourniquet, cardiac massage etc.)
- In a safe zone: fast and complete removal of clothing using a rescue knife or trauma shears (approx. 1 minute)
- Short rinsing off with plenty of water (approx. 1 minute)
- Place patient on a clean rescue sheet. Consider heat preservation. Transport the patient to the handover area to emergency medical services (approx. 1 minute)

Decontamination

All patients exposed to phenol require immediate decontamination. Patients who are able and cooperative may assist with their own decontamination. If the exposure involved liquid phenol and if clothing is contaminated, remove and double-bag the clothing.

Assure that exposed or irritated eyes have been irrigated with copious amount of 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.

In any case of dermal phenol exposure, if not already done, sponge exposed skin and hair repeatedly for at least 20 minutes with a number of sponges soaked in polyethylene glycol 300 or 400. If polyethylene glycol is not immediately available, flush for at least 20 minutes exposed skin and hair with copious amounts of plain water. After decontamination with polyethylene glycol flush the contaminated area again with copious amounts of plain water for at least 10 minutes. Continue other basic care during decontamination.

In case of phenol ingestion, **do not induce emesis. The vomitus may contain phenol and result in secondary contamination. Only if a large dose has been ingested less than 30 minutes before evaluation** of the patient's condition, consider immediate gastric lavage with a small-bore tube.

Patients who are conscious and able to swallow should be given a slurry of 30 g activated charcoal with 240 ml water.

Initial treatment

Early and consequent decontamination is the prerequisite for any successful therapy. Therapy will be empiric; there is no antidote to be administered to counteract the effects of phenol.

If signs of hypoxemia are present, humidified supplemental oxygen should be administered.

Intubation of the trachea or an alternative airway management should be considered in cases of respiratory compromise. When the patient's condition precludes this, consider cricothyrotomy if equipped and trained to do so.

Any phenol inhalation and / or ingestion and any dermal exposure to liquid phenol affecting more than 100 cm² (15 square inches) of skin should be considered as serious exposure.

Establish intravenous access in all patients with serious exposure.

Treat cardiovascular, renal, gastrointestinal, pulmonary and CNS disturbances; provide supportive care.

All seriously exposed patients should be transported to a hospital/emergency department.

After eye exposure chemical burns may result; treat as thermal burns. Immediately consult an ophthalmologist.

If phenol vapor or liquid have been in contact with the skin, chemical burns may result; after decontamination, treat as thermal burns: adequate fluid resuscitation and administration of analgesics, maintenance of the body temperature, covering of the burn with a sterile pad or clean sheet.

*Patient release/
follow-up instructions*

Patients who have a normal clinical examination and no signs or symptoms of toxicity may be discharged after an appropriate observation period in the following circumstances:

- a) The evaluating physician is experienced in the evaluation of individuals with phenol exposure.
- b) Information and recommendations for patients with follow-up instructions are provided verbally and in writing. Patients are advised to seek medical care promptly if symptoms develop or recur.
- c) The physician is comfortable that the patient understands the health effects of phenol and the provided follow-up instructions.
- d) Site medical is notified, so that the patient may be contacted at regular intervals in the 24-hour period following release.
- e) Heavy physical work should be precluded for 24 hours.
All patients with skin or eye burns should be reexamined after 24 hours.
- f) Exposure to cigarette smoke should be avoided for 72 hours; the smoke may worsen the condition of the lungs.

Patients who have skin or eye exposure should be reexamined in 24 hours.

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 paramedics and doctors at the site in assessing the condition and managing the treatment of patients exposed to phenol. It is not, however, a substitute for the professional judgement of a paramedic or a doctor and must be interpreted in the light of specific information regarding the patient available to such a paramedic or doctor and in conjunction with other sources of authority.

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