

Chlorine (CAS Registry Number 7782-50-5) is greenish-yellow reactive gas with a characteristic odour similar to bleach. It is approximately three times heavier than air and therefore collects in low lying areas. It is non-combustible but enhances combustion of other materials.

Exposure

Because it is a gas the most likely routes of exposure are inhalation and eye exposure. Injury to the skin may occur following exposure to concentrated gas or from being close to a release of pressurized liquid.

Latency period and recovery time

Symptoms of irritation to mucous membranes poisoning appear rapidly, though there may also be delayed pulmonary effects. The severity of effects depends on the concentration and on the duration of exposure.

The main features are:

- Coughing with sputum production
- Feeling of suffocation
- Wheezing/dyspnoea
- Tightness of the chest
- Rhinorrhoea
- Hoarseness
- Nausea and vomiting
- Headache
- Pneumonitis and non-cardiogenic pulmonary oedema: this may be delayed for 12–14 hours
- Hypoxia
- Cardiac arrest
- Stinging and burning of the eyes
- Lachrymation and blepharospasm
- Corneal burns
- Frostbite from contact with pressurized liquid

Principles of medical management

Chlorine is volatile so secondary contamination from exposed individuals is relatively unlikely,

however, chlorine gas can condense on the skin and contaminate others through dermal contact. Staff treating potentially contaminated patients should wear personal protective equipment. The patient's clothing should be removed and the skin washed. If clothing is stuck to the skin it should be soaked with tepid water and gently eased off. Contaminated clothing should be bagged for later cleansing or disposal.

Since the eyes and respiratory tract are the main target, organs treatment should be geared towards ensuring a clear airway, ensuring adequate oxygenation and decontamination of the eyes.

Eye exposure

Remove contact lenses if present and they can be removed easily. Irrigate the eyes with lukewarm water or normal saline solution. Examine the eyes under fluorescein stain and refer to an ophthalmologist. Seek urgent specialist advice if there has been eye contact with liquid chlorine.

Inhalation

Check arterial blood gases, chest X-ray, peak expiratory flow rate. Monitor respiratory function. Give bronchodilators and inhaled steroid if necessary. Mechanical ventilation may be needed. Monitor for secondary infection and acute respiratory distress syndrome (ARDS) and treat appropriately.

Stability/neutralization

Chlorine is very unstable and readily reacts with other chemicals and with water once released. Chlorine is also broken down by sunlight within a few minutes. Once chlorine is released it evaporates quickly forming a greenish-yellow cloud that is heavier than air and can be carried by the wind to several kilometres away from the source. In water, chlorine rapidly dissolves and forms hydrochloric and hypochlorous acids, which may be hazardous in high concentrations.

Protection

Air purifying gas mask with filters treated so as to adsorb chlorine can be used.

References

[Medical management guidelines for chlorine](#)

[Chlorine and other irritant gases \(UK Health Protection Agency\) HPA CBRN handbook](#)

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