



Illinois Poison Center
**POISON
HELP**
1-800-222-1222

833 W. Jackson Blvd
Suite 610
Chicago, IL 60607

312.906.6136
illinoispoisoncenter.org

Tear Gas or Lacrimators

Background:

Tear gas or lacrimators are a class of chemical agents used in riot control or suppression. They are chemicals dispersed as a fine dust or aerosol spray from a canister or grenade and are not true gases. The dust particles or liquid mist causes the symptoms that are typically seen.

For most individuals, symptoms usually subside within 30 to 60 minutes after removal from the source of exposure. For people who have had a prolonged high level exposure or have been trapped in an enclosed space with continuous exposure, respiratory and ocular symptoms may be prolonged and become vision and/or life threatening. Patients with mild symptomatology may present to the ER several days after exposure due to persistent symptoms.

Mechanical injuries from the rupture of the canister may lead to ocular or other soft tissue injury due to shrapnel. Corneal abrasions may be seen from eye rubbing.

The most common lacrimator agents likely to be dispersed in the event of severe civil unrest is O-chlorobenzylidene malononitrile (CS) which is less toxic than other agents in its class. It is a crystalline solid powder/dust. Other less common agents include chloroacetophenone (CN), and dibenzoxazepine (CR). While these active ingredients cause the stereotypical symptoms of tear gas agents, many adjuvants within the spray can also produce toxic effects - e.g. potassium perchlorate, epoxy resins, alcohol solvents. Rarely, methemoglobinemia has been reported.

Clinical Signs and Symptoms:

- 1) Eyes: ocular burning, pain, eyelid twitching and muscle spasm causing the eye to close tightly (blepharospasm). Initial effects may last 30 minutes or longer once removed from the source of exposure. Patients who have been in an enclosed area with an elevated concentration may suffer severe eye injuries such as chemical burns or corneal ulceration. Consider fluorescein exam for patients with prolonged pain.
- 2) Nose: Rhinorrhea, sneezing and burning pain
- 3) Oropharynx: Salivation, sore throat, burning pain
- 4) Respiratory: Cough, chest tightness, shortness of breath, wheezing and laryngospasm may be seen in symptomatic cases. Patients with underlying respiratory disease such as asthma and COPD may be more at risk for acute effects. Pulmonary edema and other severe lung injury has been reported with prolonged exposure or if the patient is in an enclosed space. Delayed bronchospasm may surface a few days and become chronic in nature with cold induced, exercise induced and allergic triggers after exposure. Chest pain for several days after exposure have also been reported.
- 5) GI: Nausea and vomiting may occur.
- 6) Skin: Redness, tingling, pain. Chemical burns may occur. Delayed bullous dermatitis or chemical contact dermatitis is possible. Situations resulting in more severe skin injury include:
 - a. In hot weather as the chemical can cling to wet or sweaty clothing and therefore be in prolonged contact to the skin or
 - b. If a prolonged exposure in an enclosed space occurs.



Most symptoms resolve after removal of exposure; however, if exposure is prolonged or in an enclosed space, death can occur.

Treatment:

Decontamination:

- 1) Remove clothing that may be contaminated with the noxious dust or mist
- 2) Decontaminate skin with cold water or cold water with soap. Avoid warm or hot water for decontamination as it might volatilize CS and cause increased respiratory exposure. Warn patients that pain may initially worsen with decontamination. Do not use hypochlorites (bleach).
- 3) Ocular decontamination: Remove contacts. Rinse eyes and face for 15 minutes with cold water. May need evaluation for corneal abrasion if persistent pain is present

Supportive Care:

- 1) Eyes: Decontaminate as needed, evaluate for corneal abrasion if persistent pain. Treat with ophthalmic antibiotics as findings indicate.
- 2) Skin:
 - a. Second degree burns of 10% or more or involvement of the hands, perineum or face may need consultation with a burn specialist/center.
 - b. For lesser burns:
 - i. First degree burns should heal without significant intervention. For second degree burns or worse:
 1. Flush with copious amount of cold water and clean with mild soap
 2. Debride loose, non-viable tissue
 3. Consider topical antibiotic ointment
 4. Non-stick dressing with sufficient gauze to absorb serous drainage
 5. Tetanus if not up to date
 6. Pain relief as appropriate
- 3) Respiratory:
 - a. Bronchodilators for wheezing
 - b. Manage airway as indicated for each patient presentation

Disposition:

The vast majority of exposed individuals will improve in 30 to 60 minutes after removal from exposure and decontamination. Most can self-decontaminate and no further treatment will be needed. Medical treatment is often not sought and most patients who present to a healthcare facility may be discharged home when asymptomatic. Patients with severe chemical ocular or cutaneous injury may need further evaluation.

Admit patients with prolonged respiratory signs and symptoms that fail to clear. Patients may present with worsening symptoms beyond 24 hrs.