

20 Questions – Riot Control Agents and Chemical Weapons

1. A) What is typical "tear gas"? B) Aside from typical "tear gas", what are other less utilized irritant riot control agents?
2. Is "Mace" what law enforcement uses?
3. How does 'OC' differ from the law enforcement riot control agents?
4. You are asked to evaluate a patient who was sprayed with a hand-held CS canister at close range several hours ago and complains of persistent severe eye pain. Is he faking it?
5. Another patient was sprayed at the same time and complains of increasing respiratory distress. She has a history of asthma, and is wheezing. Is this related to the tear gas?
6. During another episode of unrest at home, you spray your children down with CS, then feel remorseful and hose them down, leaving them in their wet clothes. Why is this a bad idea?
7. A 'professional protestor' is exposed to CS on a nearly daily basis. Does the agent tend to affect him more or less as he is exposed repeatedly?
8. Another, less professional protestor was exposed to CS in Washington about 2 months ago and is re-exposed in Minneapolis. Within 24h, she is admitted to the burn unit with severe skin necrosis. In contrast to the case above, what did she probably develop?
9. During a demonstration, a canister of CS lands in a pile of trash next to a gasoline truck parked on the street. What should you do?
10. A canister of Chlorine gas is ruptured in the lobby of an un-named downtown hotel to disrupt a conference. Many people leave the building with irritation of the nose, throat, and eyes. How dangerous is this irritation?
11. What complication can you expect at least some of these people to develop within 24 hours that will make them call 911?
12. Following a demonstration, the street is being cleaned when a maintenance person triggers an explosive device. As several people go to help him what do they need to be careful to look for in the area?
13. As the first persons rush into the area to help, they rapidly collapse. You can see at least one of them having a seizure. What agent do you suspect may be present?
14. What are the cardinal signs of nerve agent (organophosphate) toxicity?
15. Can you put on your new PAPR and rush safely to the aid of those who are stricken?
16. What is the therapy for nerve agent poisoning?
17. How important is decontamination for nerve agent victims?
18. How about for riot control agent victims?
19. During a demonstration on Nicollet Mall, a plume of smoke goes up. Demonstrators are shouting 'Cyanide gas!'. Is it likely to be cyanide, and if it is, do you need to worry?
20. What part of your protective equipment offers the most protection for you from a variety of chemical agents?

20 Answers – Riot Agents and Chemical Weapons

1. A) The most common lachrimation/irritant agents used in riot control are: Chloracetophenone(CN), Chlorobenzalmalononitrile (CS), Chloropicrin(PS), Bromobenzylcyanide(CA), dibenzoxazepine(CR), and Oleoresin Capsicum (OC). CS and OC are by far the most commonly encountered in civilian law enforcement operations and will be the 2 most often encountered by EMS. B) Vomiting agents, like adamsite (DM) are rarely used by

the military. Sneezing agents are sometimes deployed by demonstrators, but do not see much organized use.

2. No, although the term "mace" is often used by people to refer to any chemical irritant used by law enforcement. . Mace is CN (not to be confused with CN as in cyanide!), which is the original military tear gas. It has largely been replaced by CS which is much less toxic than CN (causes eye symptoms at lower doses, thus the risk of toxicity is less). An even newer agent, CR, is even more potent (and therefore less toxic) but has not yet become the riot control agent of choice. Currently, law enforcement primarily uses CS, OC or a combination of the 2 agents.
3. Oleoresin Capsicum (OC) or "pepper spray" is derived from capsaicin which is the compound in hot peppers that makes them hot. It causes some of the same effects as true tear gasses, but has not been associated with as much toxicity. It cannot be as reliably distributed over a larger area and thus is used mainly directly sprayed into an attacker's face.
4. Probably not. Riot agents are solids suspended in liquid and can be deployed from hand-held canisters, shot as rounds that break and release chemical upon impact, or launchable "grenades" that aerosolize upon landing through a timed ignition fuse. When deployed from hand-held canisters, it is intended as close range deployment and comes out as a stream of liquid or foam. The stream uses an inert propellant to allow it to be sprayed at people several feet away. If it is sprayed at very close range, the force of the propellant can cause abrasions to the cornea, which can cause progressive pain for days.
5. It may be. Because riot control agents are irritant in nature, they can cause a subjective sense of being unable to breathe. In rare cases, immediate and delayed bronchospasm has been reported following tear gas use, up to 12-24 hours later, but this is uncommon. Deaths have also been reported on rare occasion in asthmatic patients exposed to tear gas and the association between the exposure and the death is not completely clear. However, to be safe, anyone who has been exposed and is complaining of respiratory distress should be monitored closely and cared for as you would any other patient.
6. CS and CN both cause skin irritation and can cause mild skin burns. With higher temperatures, and especially with humid conditions or wet clothes/skin, severe burns can occur. For this reason, skin washing and removal of contaminated clothing is recommended when these conditions exist or erythema is noted. Also, be aware that if a person is irrigated while standing upright (such as in a shower) and they remain fully clothed, the run-off from their initial target areas (typically face and neck) will run downwards and be trapped within clothing such as underwear and can actually cause irritation in other sensitive areas of the body (such as the groin). Removal of clothing prior to showering will help prevent this.
7. Less. Frequent exposure often leads to tolerance, to the point that individuals can continue to function fairly well in environments that leave others in a weeping heap. So if you were a really serious demonstrator, you could train for this!
8. Unfortunately, some people develop a hypersensitivity syndrome and react very strongly to these agents when exposed again. Severe skin necrosis can occur. There is really no way to predict who will develop this type of reaction but it is always good advice to avoid being on the receiving end of chemical irritants.
9. It depends on what type of canister it is (see answer #4). If the canister is a hand-held type, there is very little danger. Most hand-held canisters use non-flammable ingredients because they are designed to be used by law enforcement in situations where sources of ignition are frequently present (such as a TASER electrical weapon). If it is a launchable impact round, the danger is also very low because these rounds deploy chemical based on impacting a solid surface (such as a door or wall) and use the energy of the impact to disperse the chemical

irritant. If it is a launchable "grenade" style round, you should RUN. This is because the grenade style canisters deploy chemical using a timing fuse that ignites and disperses chemical in a gas format. The ignition of this fuse will cause a fire under circumstances where there is adequate fuel and oxygen. Launching one of these into a pile of trash next to a gasoline truck could be disastrous. Grenade canisters of CS were a significant contributor, if not the cause, of the fire at the Branch Davidian compound in Waco, TX.

10. Chlorine gas is also an irritant but is not considered to be a riot control agent. The initial irritation from chlorine gas may lead to bronchospasm, especially in asthmatics, and rarely to upper airway swelling, but is more often a nuisance. However, in significant quantities, it can cause respiratory distress so, to be safe, anyone who has been exposed and is complaining of respiratory distress should be monitored closely and cared for as you would any other patient.
11. Delayed pulmonary edema, which can be fatal occurs in a minority of cases of chlorine exposure. If severe, this usually will make itself known by 4 hours, but can be delayed up to a day later. Usually if the delay is long, the edema won't be as severe.
12. SECONDARY DEVICES! In 1997, the abortion clinic bombing outside Atlanta was the first domestic case in which a bomber targeted a secondary device at public safety responders. This tactic has now gained in popularity with terrorists around the globe. Explosions in public areas of unclear etiology (most will be unclear initially) should cause responding EMS personnel to maintain the "get in and get out" mentality to avoid being a victim.
13. In an open air environment, about the only agent that would cause such rapid collapse and seizure activity would be the nerve (organophosphate) agents. Obviously, in a situation like this, you should not rush in, notify all responders of the potential hazard, and stage in an upwind, uphill location.
14. Miosis (small pupils) will be present in ALL persons with significant vapor exposure to nerve agent (occasionally, if a small amount contaminates only the skin, they won't have miosis). Look for this plus the presence of copious bodily fluids such as salivation, lacrimation, rhinorrhea, vomiting and diarrhea (cholinergic symptoms), and often early seizure activity. Ambulatory patients will usually complain of eye pain (due to the miosis and other factors), runny nose, and tight chest. After exposure to liquid on skin, symptoms may be delayed minutes to 18h. The longer the delay, the less the toxicity.
15. The PAPR is approved for low-level environments. It actually does very well in high concentration areas too, but is NOT approved for use in the hot zone. Get somebody with SCBA to go in and drag them out to a safer area. If there is risk of skin contamination with the organophosphate material, protective outerwear also needs to be worn (standard firefighting bunker/turnout gear is not protective for this type of work).
16. Seizures are treated with benzodiazepines (eg: midazolam, as usual). Ventilation may be difficult due to bronchospasm and profuse secretions. Atropine IM or IV will dry the secretions and allow ventilation (usually start with 2mg and go up – average to control secretions in Tokyo sarin incident was 2 mg although be prepared to go much higher). Once at the hospital, Pralidoxime can be given as an antidote before the effects of the nerve agent become permanent. This window is about 4h for sarin (most common), 12h for VX, and down to minutes for Soman (luckily harder to obtain or make!).
17. VERY. 110 EMTs were sickened in Tokyo because they cared for contaminated individuals without any protective equipment. Decontamination for vapor exposure basically means clothing removal and sealing clothes in plastic bags to prevent 'off-gassing', liquid exposure means clothing removal and soap/water wash. If unsure which, go for the undress and wash.

18. NOT very (at least from the rescuer's perspective). Riot control agents can 'off-gas' but at a much lower risk, as their toxicity is so low. Good ventilation is usually all that is required (in the field, a good recommendation is to stand them facing into the wind or in front of a fan if available). If caring for several victims, you may wish to have them remove clothes if they're going to be in an enclosed space to avoid continual off-gassing exposure from clothing to each other. For those with significant exposure or skin symptoms/signs should wash off at some point, but you should feel comfortable caring for these patients with standard precautions (eg: GLOVES) and avoid transfer of the irritant to yourself by not touching your skin, rubbing your eyes, etc.
19. Unlikely. Cyanide is usually invisible, though if the gas is being explosively released, or was stored at below freezing, you may see a plume due to condensation. Cyanide is a very POOR open air toxin. It requires a closed space and high concentrations to induce symptoms. Cyanide usually either results in death or complete recovery without much in between. Symptoms of low-grade exposure include headache and dizziness. High concentrations cause rapid cardiovascular collapse, often with hypoxia/acidosis related seizures, and death.
20. Gloves. The primary risk to responders is CONTACT with chemicals. Vapor hazards from off-gassing have been documented with nerve agents, but with most chemicals this is not a problem. With an unknown agent, do not take chances! The sicker a patient is after exposure, the higher the toxicity, and the better the chance that it's a threat to you. Unless you know what you're dealing with and are assured of your safety, stay out of the hot zone and in your protective equipment!