

Chapter 6

INCAPACITATING AGENTS

Summary

NATO Code: BZ

Signs and Symptoms: Mydriasis, dry mouth, dry skin, increased deep tendon reflexes, decreased level of consciousness, confusion, disorientation, disturbances in perception and interpretation (illusions and/or hallucinations), denial of illness, short attention span, impaired memory.

Field Detection: No field detector is available.

Decontamination: Gentle but thorough flushing of skin and hair with water, or soap and water, is all that is required. Remove clothing.

Management: *Antidote:* physostigmine. *Supportive:* monitoring of vital signs, especially core temperature. Position patient to protect airway until effects of central respiratory depression diminish.

Overview

Incapacitating agents are chemical substances designed to act on the central and peripheral nervous system to inhibit an individual's ability to perform work or complete the mission. Several categories of agent can achieve these deleterious effects, but BZ will be highlighted in detail because it has been weaponized in the past. Other types of incapacitating agents include:

- **irritants**, such as riot-control agents (CS, CN), pepper spray;
- central nervous system **stimulants**, such as amphetamines, cocaine, caffeine, and nicotine;
- central nervous system **depressants**, such as barbiturates, narcotics, antipsychotics, and benzodiazepines;
- **psychedelics**, such as lysergic acid diethylamide-25 (LSD), 3,4-methylenedioxy-methamphetamine (“ecstasy”), and phencyclidine (PCP); and
- **deliriant**s, such as anticholinergics (BZ, Agent 15).

Many of these agents have been studied as incapacitating agents in the past and may again be agents of interest in the future.

Physical Characteristics

BZ is a crystalline solid at standard temperature and pressure. Its high melting point (150–152°C/302–306°F) makes it ideal for dispersal in explosive munitions. Suspended in solvents, it can contaminate food or be absorbed through the skin.

Detection

There are no detectors for these agents.

Effects

“Dry as a bone, red as a beet, hot as a hare, and mad as a hatter.”

BZ interferes with the cholinergic synapses in the central nervous system, causing disruptions of memory, problem solving, attention, and comprehension. Signs of anticholinergic poisoning progress as follows:

- increased body temperature (“hot as a hare”);
- lack of sweating, causing the skin to be dry to the touch (“dry as a bone”) and red (“red as a beet”); and
- slurred speech, stumbling gait, slowness of movement and thinking, and delirium (“mad as a hatter”).

Patient delusions are characteristically based on real objects; for instance, they may see someone's hand as holding a hamburger and bite the person's hand, they may shoot at clouds thinking they are flocks of ducks, or they may hide, thinking small animals or shadows are large, wild animals. Movement will be clumsy and thinking slowed. Symptoms such as delirium are seen several hours after exposure and progress in intensity for several days until the toxin is eliminated from the body in the urine and recovery begins.

Self-Aid and Buddy Aid

Those exposed to BZ have difficulty performing their duties and following instructions. Weapons and other harmful items must be removed from these individuals. In the event of a follow-on chemical attack, patients will need others to help them mask. Protective ensemble must be worn by those assisting the contaminated patient until decontamination is accomplished. The ability to sweat is diminished, making the patient susceptible to heat stress. If the patient's body temperature is greater than 39°C /102°F, they should be moved to the shade and cooled with water or damp cloths. Evacuation to the rear should be considered as early as the situation permits.

Care Provider Actions

BZ casualties may act on their delusions, so they must be kept safe from harming themselves or others. Behavioral symptoms will worsen over the course of a day or more, so patients should be evacuated to a medical facility as soon as feasible. Heat stress is also a real concern. If available, the antidote physostigmine can be given by injection (45 µg/kg in adults; 20 µg/kg in children) or orally, mixed with a flavored drink, if the patient is cooperative. Intravenous administration should be avoided because overdose symptoms, similar to effects of nerve agent exposures, can result if patients are not closely monitored. Primarily given to manage behavior during transport, the antidote must be readministered every hour and titrated to behavior.

Casualty Decontamination

BZ casualties must be decontaminated because dry particles of the agent can remain on outer clothing, on the skin, or in the hair after direct exposure ends. Removal of the outer clothing, accompanied by a water (or soap and water) wash is the best solution. Decontamination with water also helps cool the patient. Decontamination teams must wear protective masks and protective clothing.