

Chapter 3

CYANIDE

Summary

NATO Codes: AC, CK

Signs and Symptoms: AC: Headache, dizziness, nausea, sweating, rapid breathing, minor eye and skin irritation, rash. CK: As above with more pronounced skin and eye irritation and intolerable tearing. Exposures to high concentrations of either agent will rapidly cause seizures and respiratory and cardiac arrest.

Field Detection: Joint Chemical Agent Detector (JCAD), M256A1 Chemical Agent Detector Kit, M18A2 Chemical Agent Detector Kit, and M90 Chemical Warfare Agent Detector detect hydrogen cyanide (AC) as vapor or gas in the air, and the M272 Chemical Agent Water Testing Kit detects AC in water.

Decontamination: Skin decontamination of AC is usually not necessary because the agent evaporates rapidly. CK should be decontaminated with water or other standard non-bleach decontaminants. CK and hypochlorite will produce a violent chemical reaction. Contaminated clothing should be removed and disposed of.

Management: *Antidote:* intravenous sodium nitrite and sodium thiosulfate. *Supportive:* oxygen, correct acidosis.

Overview

The two cyanide agents (also known as cyanogens and blood agents) of most concern are hydrogen cyanide (AC) and cyanogen chloride (CK). These agents kill by disrupting oxygen utilization at the cellular level.

Physical Characteristics

AC is highly volatile and lighter than air, which causes rapid vaporization of the liquid following release and minimizes the likelihood of a liquid exposure under most conditions. The vapor expands outward, rapidly lowering air concentration. CK is less volatile than AC and heavier than air, allowing it to cling to the ground near the point of delivery and flow into low areas (such as foxholes). However, within a short time neither agent will pose a serious threat downwind from the release point due to rapid dissipation. The M45 and M50 protective mask filters should be exchanged following exposure to AC or CK.

Detection

The only detection available to the soldier is the M256A1 Chemical Detection Kit (explained in detail in Chapter 11, Individual Protective Equipment). The first indication of contact with AC might be the smell of bitter almonds, but only approximately half of the population are able to detect the odor of cyanide, so odor should never be relied upon as a means of detection. CK has a bleach-like odor, but the initial effects of CK poisoning (mucous membrane irritation, tearing) can occur at exposures too small for a human to smell the agent, so again, odor is not useful as a means of detection or identification.

Effects

Death can occur within minutes after exposure to a high concentration of cyanide gas. Lower concentrations will produce a slower onset and/or more limited scope of effects. The major

Table 3-1. Effects From Cyanide (AC and CK) Vapor Exposure

Exposure	Signs and Symptoms	Course	Time
Moderate, from low concentration	Transient increase in rate and depth of breathing, dizziness, nausea, vomiting, headache.	These may progress to severe effects if exposure continues.	The time of onset of these effects depends on the concentration but is often within minutes after onset of exposure.
Severe, from high concentration	Transient increase in rate and depth of breathing, in 15 seconds. Cessation of respiration, in 2 to 4 minutes. Cessation of heartbeat, in 4 to 8 minutes.	Death if untreated.	Within seconds after onset of exposure.

signs and symptoms are shown in Table 3-1. In addition, severe exposure to CK may cause eye and skin ulcerations, full thickness burns, and serious damage to the airways. These chlorine-related symptoms may progress even after the symptoms from the cyanide component of the agent have abated.

Self-Aid and Buddy Aid

The only self-aid for AC and CK is to don a protective mask. The only buddy aid for AC or CK exposure involves helping a soldier mask and then removing the victim from the contaminated site.

Care Provider Actions

The symptoms shown in Table 3-1 may occur within moments and lead to death within minutes.

Rapid evacuation and administration of cyanide antidote therapy will greatly improve survivability.

Use of intravenous antidotes in a contaminated field environment may not be possible. However, the first step is to utilize inhalable nitrites (amyl nitrite “poppers”). Amyl nitrite is available in premeasured vials. If it is safe to do so, the mask seal

may be broken momentarily to allow the placement of a nitrite inhalant tab inside the protective mask. Oxygen, if available, will also help reverse the symptoms of cyanide poisoning.

An exposed casualty who can walk and talk 5 minutes after removal from exposure has an excellent chance of survival.