

A Review of Acute Cyanide Poisoning With a Treatment Update

Facts

Cyanide causes intracellular hypoxia by reversibly binding to mitochondrial cytochrome oxidase a_3 . Signs and symptoms of cyanide poisoning usually occur less than 1 minute after inhalation and within a few minutes after ingestion. Early manifestations include anxiety, headache, giddiness, inability to focus the eyes, and mydriasis. As hypoxia progresses, progressively lower levels of consciousness, seizures, and coma can occur. Skin may look normal or slightly ashen, and arterial oxygen saturation may be normal. Early respiratory signs include transient rapid and deep respirations. As poisoning progresses, hemodynamic status may become unstable.

Initial management of patients with acute cyanide poisoning requires rapid assessment and identification of the most likely route of exposure to determine proper decontamination (see Table).

The key treatment is early administration of 1 of the 2 antidotes currently available in the United States: the well-known cyanide antidote kit and hydroxocobalamin. Hydroxocobalamin detoxifies cyanide by binding with it to form the renally excreted, nontoxic cyanocobalamin. Because it binds with cyanide without forming methemoglobin, hydroxocobalamin can be used to treat patients without compromising the oxygen-carrying capacity of hemoglobin.

Table Management of patients with acute cyanide poisoning^a

Decontamination	Basic Life Support/Advanced Cardiac Life Support (ACLS)	Antidotal therapy	Supportive care
<p>Smoke inhalation</p> <ul style="list-style-type: none"> Remove from source into fresh air Remove contaminated clothing <p>Dermal exposure^b</p> <ul style="list-style-type: none"> Remove wet clothing Wash skin with soap and water or water alone Irrigate exposed eyes with water or saline Remove contact lenses <p>Ingestion</p> <ul style="list-style-type: none"> Do not induce emesis Activated charcoal may be administered if the victim is alert and the ingestion occurred within 1 hour Isolate emesis (it may emit hydrogen cyanide) 	<ul style="list-style-type: none"> Establish ABCs (airway, breathing, circulation) Establish intravenous access Start cardiac monitoring Start ACLS if respiratory or cardiovascular compromise evident 	<ul style="list-style-type: none"> Administer the cyanide antidote kit or hydroxocobalamin once an airway has been secured 	<ul style="list-style-type: none"> Admit to an intensive care unit for cardiac monitoring, respiratory and cardiovascular support Perform routine laboratory testing, including arterial blood gas analysis, serum lactate levels, complete blood cell counts, serum glucose level, a serum cyanide level (confirmatory), and electrolyte levels Monitor and treat dysrhythmias Monitor for and treat adverse effects of antidotal therapy

^a Based on data from Koschel MJ. Management of the cyanide-poisoned patient. *J Emerg Nurs.* 2006;32(4 suppl):S19-S26.

^b Protection of responders from contamination is essential with the use of personal protective equipment such as face masks, eye shields, and frequent double gloving or the use of butyl rubber gloves.

Hamel J. A review of acute cyanide poisoning with a treatment update. *Crit Care Nurse.* 2011;31(1):72-82.