

Hydroxocobalamin (Cyanokit®)

Cyanide is a potent and ubiquitous toxin that can cause rapid clinical deterioration and death if not recognized quickly. The most common etiology of cyanide exposure in the U. S. is through smoke inhalation from house or structural fires. Cyanide causes its toxicity by binding to the ferric ion in cytochrome oxidase and inhibiting oxidative phosphorylation, thereby halting cellular respiration.

For many years the only antidotal therapy available in the U.S. was the Cyanide Antidote Kit. This three-component kit contains amyl nitrite, sodium nitrite, and sodium thiosulfate. While effective, the Cyanide Antidote Kit also has many drawbacks. The nitrites induce methemoglobinemia which can be deadly in patients with concurrent carbon monoxide poisoning. Additionally, the nitrites are potent vasodilators which cause hypotension and reflex tachycardia. There are case reports of pediatric fatalities from dosing errors which resulted in profound methemoglobinemia and hypotension. This has led some healthcare providers to disregard the nitrites altogether and use only sodium thiosulfate, although it has a slow onset of action

The FDA approved **hydroxocobalamin** for use as a cyanide antidote in December 2006 and it has recently become available for widespread distribution. It is marketed by Dey, L.P. as **Cyanokit®**. Hydroxocobalamin chelates cyanide and forms cyanocobalamin (a form of vitamin B₁₂) which is excreted in the urine. The kit contains two 2.5 g vials of hydroxocobalamin as a lyophilized powder. Each vial should be reconstituted with 100 mL of normal saline. Dosing for adults is 5 g administered as an IV infusion over 15 minutes. A second 5 g dose can be given if an incomplete clinical response is observed. Pediatric patients should receive 70 mg/kg as an initial dose. Due to its red color, hydroxocobalamin causes self-limiting skin reddening and chromaturia in most patients that may last up to a week. Hydroxocobalamin also causes a transient, relative hypertension which resolves within 4 hours. Allergic reactions are possible, including pustular rash and face swelling. These effects can effectively be treated with antihistamines and steroids. Cyanokit® is a safe and effective alternative to the Cyanide Antidote Kit and has the potential to become the mainstay of therapy for cyanide poisoning victims. Call the Maryland Poison Center for assistance in diagnosing and managing all poisonings, including cyanide.

Bryan D. Hayes, PharmD, Clinical Toxicology Fellow

DID YOU KNOW THAT... poisoning by cyanide is thought to be as common as carbon monoxide poisoning in smoke inhalation patients?

Hydrogen cyanide is a gas that is generated by the combustion of nitrogen- and carbon-containing polymers and fibers such as plastics, nylon, wool, cotton, paper and silk, all commonly found in homes and buildings. In studies, cyanide has been found to be directly associated with fire deaths. Cyanide poisoning should be suspected in all fire victims, especially those exposed to closed-space fires (high heat and low oxygen conditions), and in patients with altered mental status, hypotension, or metabolic acidosis.



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If you do not wish to receive faxes or emails from the Maryland Poison Center, call 410.706.7604 or circle your fax number and fax this back to 410.706.7184. Supported by Maryland Department of Health and Mental Hygiene

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