Cyanide poisoning: Underappreciated risks, novel diagnostic approaches, therapeutic alternatives

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Objective: To review recent literature and events related to cyanide poisoning and its diagnosis and to discuss various treatment options. **Methods**: A review of PubMed articles appearing since 2005 related to cyanide poisoning in humans was undertaken. Recent abstracts and articles were reviewed from additional sources. Publications were evaluated for information regarding underappreciated and/or emerging threats from cyanide as well as for advances in diagnostic and treatment methods. **Results**: Current analyses and events indicate that cyanide continues to pose a potential threat as an agent of chemical terrorism, particularly in indoor environments, such as shopping areas and confined spaces, such as subways. A number of planned attempts at using cyanide have been thwarted and will be discussed. Additional evidence has emerged confirming the significant risk of cyanide poisoning in fire smoke inhalation. Furthermore new data suggests a possible risk of cyanide poisoning from deliberate automobile exhaust inhalation. While the concentrations achieved are unlikely to be lethal alone, cyanide may (as is the case for fire smoke inhalation) pose a risk of combined lethality with carbon monoxide under such circumstances. Novel real-time diagnostic methods, such as *in vivo* diffuse optical spectroscopy for cyanide poisoning are currently under investigation. In addition, more has been learned about the imaging evaluation of neurological sequelae of cyanide poisoning, which may alter considerations of smoke inhalation therapy. Finally, new data has been published regarding the safety, efficacy and adverse effects associated with currently available cyanide antidotes, including hydroxocobalamin, sodium thiosulfate, and dimethylaminophenol. Hydroxocobalamin has been recently approved for use in the United States and Europe. Antidote stocking to deal with multiple casualty incidents involving cyanides continues to be inadequate in many locales. **References**: 1. Keim ME. Terrorism involving cyanide: the prospect of improving preparedness in the prehospital setting. Prehosp Disaster Med 2006:21 (2 Suppl 2): s56-60. 2. Borron SW, Baud FJ, Barriot P, et al. Prospective study of hydroxocobalamin for acute cyanide poisoning in smoke inhalation. Ann Emerg Med. 2007;49:794-801. 3. Canfield DV, Chaturvedi AK, Dubowski KM. Carboxyhemoglobin and blood cyanide concentrations in relation to aviation accidents. Aviat Space Environ Med 2005;76:978-80. 4. Baum MM, Moss JA, Pastel SH, et al. Hydrogen cyanide exhaust emissions from in-use motor vehicles. Environ Sci Technol 2007;41:857-62. 5. Lee J, Armstrong J, Kreuter K,et al. Non-invasive in vivo diffuse optical spectroscopy monitoring of cyanide poisoning in a rabbit model. Physiol Meas 2007;28:1057-66. 6. Hantson P, Duprez T. The value of morphological neuroimaging after acute exposure to toxic substances. Toxicol Rev. 2006;25:87-98. 7. Uhl W, Nolting A, Golor G, et al. Safety of hydroxocobalamin in healthy volunteers in a randomized, placebo-controlled study. Clin Toxicol 2006;44

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