ToxTidbits

Maryland Poison Center
UNIVERSITY OF MARYLAND SCHOOL OF PHARMACY

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The Maryland Poison Center's Monthly Update: News, Advances, Information

Detergent suicides

"Detergent suicides" (also known as "chemical" or "gas" suicides) refer to self-harm attempts carried out through the intentional mixing of two different chemicals to create toxic gases. An increasing trend in these exposures was observed in Japan during 2008, which reported a total of 220 cases of attempted gas suicides over a 4-month period *(J Occup Med Toxicol. 2010; 5: 28).* Since 2008, numerous cases have been identified in the United States. Surprisingly, the individual chemicals that are used in these cases can be easily purchased through online vendors or in-person at hardware or convenience stores.

Detergent suicides typically involve mixing an acidic cleaning agent with other compounds in order to produce carbon monoxide, hydrogen cyanide or hydrogen sulfide gas *(West J Emerg Med. 2011 Jul; 12(3): 300–304).* Cases of detergent suicides are often performed in an enclosed space such as a vehicle by using different glassware or mixing tools on the vehicle's floor. Signs warning of the danger may be posted on the window of these vehicles to alert others.

Mild symptoms such as mucous membrane or respiratory irritation can occur due to the individual chemicals or the toxic gas that is produced. However, individuals are often exposed to high concentrations in an enclosed area, which can lead to loss of consciousness, apnea, cardiopulmonary arrest and eventually death. These effects can be particularly rapid with exposures to cyanide or hydrogen sulfide gas *(Am J Forensic Med Pathol. 2013 Mar;34(1):23-5).*

The most critical component in the management is to ensure the safety of first responders and any nearby individuals. Personal protective equipment (PPE) that protects individuals from breathing in toxic fumes should be donned by anyone going near or entering the vehicle. A safety zone should be established around the area of exposure that prevents anyone from being nearby while the space is ventilated *(West J Emerg Med. 2016 Nov;17(6):680-683).* Unfortunately, many patients are deceased at the time of discovery. If the individual is alive, they should be immediately moved to fresh air. Supplemental oxygen should be provided along with supportive care measures such as endotracheal intubation and advanced cardiac life support when required. Specific management for carbon monoxide include the administration of 100% FiO_2 using a non-rebreather or continuous positive airway pressure device. Hyperbaric oxygen therapy may be indicated in certain circumstances. Intravenous hydroxocobalamin (5 g IV x1, may be repeated once) can be given to individuals poisoned by hydrogen cyanide gas. Exposure to hydrogen sulfide gas can be exceptionally lethal and management for these exposures revolves around removing the individual from the source of exposure and providing good supportive care measures.

This Actually Happened

The Maryland Poison Center was contacted regarding an adult female patient who had been found by first responders in her automobile with a mixture of different chemicals beside her. The chemicals were identified as formic acid and a liquid drain cleaner which contained sulfuric acid.

Upon arrival to the emergency department, the patient was asymptomatic and hemodynamically stable aside from being slightly tachycardic with a heart rate of 127 beats per minute. Initial laboratory draws in the emergency department revealed an elevated carboxyhemoglobin concentration. The patient was treated with hyperbaric oxygen therapy.

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