

Suicidal Asphyxiation by Using Pure Helium Gas

Case Report, Review, and Discussion of the Influence of the Internet

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Abstract: Suffocation by inhaled gases has been reported involving a variety of gases. We report a case of suicidal asphyxiation by forced replacement of oxygen with helium by using a complex homemade mask. In this case, a young woman researched suicide on the Internet and found an advocated method of suicide using helium. To our knowledge, there is only 1 previously reported case of suicidal asphyxia by using helium.

Key Words: suicide, asphyxia, suffocation, helium, Internet

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Suicide by asphyxiation is more commonly associated with hanging or drowning, since asphyxiating gases are not a commonly used means of suicide.¹ Deaths from smothering gases are usually the result of accidental industrial or environmental exposure; however, suicidal examples have been reported.^{1,2} Toxic gases may accumulate in various conditions. Fires, for example, may deplete the environment of oxygen and liberate gases such as carbon monoxide and cyanide.³ Carbon dioxide gas accumulates in grain silos, wells and shafts in limestone, and also in fires.³ Nitrogen also may accumulate and replace oxygen in industrial metal chambers as the steel walls may rust, consuming environmental oxygen in producing ferric oxides.³ These result in a reduction and/or replacement of atmospheric oxygen. In these conditions, death may result more rapidly than with pure anoxia alone. Suicidal suffocation has been reported by using propane and carbon dioxide.¹ There is 1 report of an accidental suffocation with pure helium gas.⁴ Another case showed asphyxial suicide by using helium and a plastic bag.⁵ Our case involves a very rare suicidal death of a young person

using helium, a complex homemade mask, and instructions she discovered on the Internet to induce asphyxiation.

Case History

The decedent was a 19-year-old white woman with previous unsuccessful suicide attempts who researched methods of suicide by using the Internet and discovered the website for the Church of Euthanasia. This group believes the earth cannot support the expanding human population and advocates suicide as a means of population control. They recommend helium as their suicide method of choice and provide detailed instructions toward this end. She obtained a tank of helium from a local supply company. The suicide apparatus was constructed by obtaining a commercially available simple air filter mask, modified by coating the exterior surface with a substance similar to liquid Wite-Out correction fluid, making the mask gas impermeable. A length of clear plastic tubing connected the mask to the tank valve. Duct tape was used to seal the mask to the skin of the face, covering the nose and mouth. When setup was complete, the helium tank valve was opened. The decedent was found in the back seat of her car, lying on her back with the base of the helium tank on the floor and the valve of the tank between her knees. The tank valve was open. There was a sign in the right rear window stating: “Caution—Helium in this vehicle” (Fig. 1). Suicide notes and a page from the Church of Euthanasia website about “How to Kill Yourself” were found in an envelope on the driver’s seat. Also in the envelope was a note card with a handwritten map to a local general store with a list of materials to buy, including tubing, airtight mask, and duct tape. Separate wording stating “make sure connections are tight,” “mask is tight” and “quicker unconsciousness” were also present. A letter was found in her residence, indicating where she could be found.

Autopsy revealed a well-nourished white woman of 67 inches and 125 pounds. The body was dressed in appropriate clothing. There was no evidence of trauma or injury. There were conjunctival petechiae bilaterally. The mask was present, with a clear tube passing under the right edge, ending in front of the nose and mouth, and was still sealed to the surrounding skin of the face with duct tape (Fig. 2). The nares

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FIGURE 1.

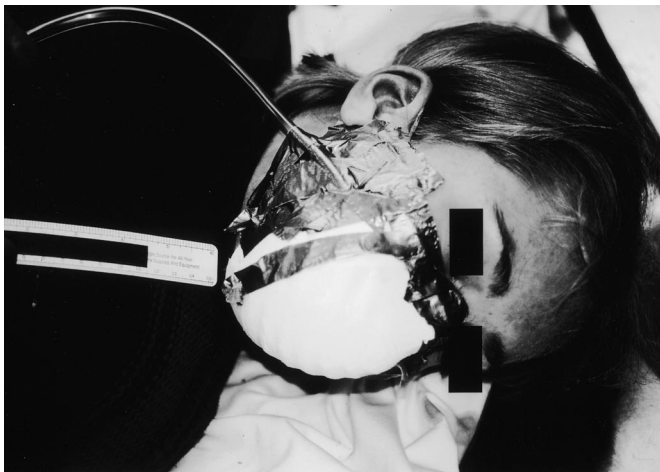


FIGURE 2.

contained frothy white edema fluid. Gray-white frothy edema fluid also protruded from the oral cavity. There were no epicardial or pleural petechiae. The right lung weighed 670 g and the left lung weighed 620 g. The lungs were congested and there was severe pulmonary edema. Routine toxicology was unremarkable. Death was determined to be due to asphyxiation resulting from inhalation of helium, resulting in environmental hypoxia. The manner of death was designated suicide.

DISCUSSION

Asphyxial deaths result from failure of the cells of the body to use or receive oxygen. Such an oxygen-poor state may be partial, known as hypoxia, or complete, known as anoxia.⁶ Classic (but nonspecific) signs of asphyxia include petechial hemorrhages, congestion and edema, cyanosis, en-

gorgement of the right side of the heart, and fluidity of blood.^{3,4,6}

Asphyxiation by pure inert gas is a very rare occurrence.⁴ To our knowledge, only 1 prior case of the use of pure helium to commit suicide has been reported.⁵ Only 1 prior case of accidental asphyxiation by helium was discovered through a search of the literature. This case involved an adolescent male under the influence of alcohol who had inserted the upper half of his torso into an advertising balloon that was filled with pure helium.⁴ Grossly, this case showed marked congestion of the lungs and pulmonary edema. There was congestion of the organs, mucosal petechiae, and frothy fluid in the pharynx and air passages, classic findings of asphyxia.

Toxicological results in gas asphyxia cases are usually negative. If desired, special steps need to be taken to collect samples to analyze for gases or volatile substances. One could evaluate the lung by securely tying the main bronchus. The hilum is then divided, and the lung is immediately placed into a nylon bag that is then sealed and sent to the laboratory.³ Standard plastic bags are not suitable, as they are permeable to such substances. To collect blood samples for such substances, paint canisters, glass tubes with aluminum foil, or Teflon-lined caps are needed.³ These volatile substances will otherwise escape through the rubber tube caps.

The scene investigation must be thorough to accurately determine the nature of the death. In our case, the victim left many hand-signed suicide letters, including 1 absolving the company from which she obtained the helium tank of any liability for using their helium tank to commit suicide, and the autopsy revealed no other explanation for death. The condition of the scene, body, and clothing were consistent with suicide.

Asphyxia by obstruction of the airway is also seen in this case where the sealed mask has a smothering effect. Smothering is due to mechanical obstruction of the external airways, causing asphyxiation through inability to breathe. These deaths are most commonly homicide or suicide.⁷ Our case made use of a filter type mask, modified to make it impervious to outside air. These modifications alone may have been sufficient to cause asphyxiation even without the additional use of helium. A similar method was reported in Israel where victims used gas masks distributed by the Civil Defense during the Gulf War. The victims sealed the gas masks by leaving plastic plugs in the masks' charcoal canister filters, effectively sealing out the ambient oxygen.⁸ These plastic plugs were supposed to be removed prior to use of the mask. In those cases, the suicide victims successfully induced asphyxiation using sealed masks alone. As most masks, such as the one in our case, are not completely airtight, the addition of helium served to effectively replace any available oxygen, resulting in a more rapid loss of consciousness and death.

The Church of Euthanasia's Internet site advocates helium as their preferred method of suicide because this inert gas is odorless, colorless, nonflammable, widely available and inexpensive, quick, painless, discrete, accessible, clean, and a certain means of suicide. They consider it an "excellent suicide method."⁹

The source of accidental exposure to helium is usually from industry.¹ Helium in its liquid state is 1 of industry's most commonly used cryogenic liquids. In the event of a spill or leak, liquid helium rapidly changes to its gaseous state. These gases may be produced in great quantities as a result of even a small release of the cryogenic liquid.¹⁰ Helium expands very rapidly from its liquid state to a gaseous state that is 885 times the volume of its liquid state. Because helium is an anoxic gas, there is a risk of asphyxiation if enough is released into a small or poorly ventilated area. Helium is a colorless, odorless, and nonflammable gas that may rapidly overcome an unsuspecting individual.^{5,10} Helium is an inert gas at room temperature and normal pressures and acts as a simple asphyxiant, with its effects due to lack of oxygen. The toxicological and physical/chemical properties of helium are unlikely to aggravate any preexisting medical condition.¹¹

Depending on the scene, rescue personnel may be quickly incapacitated if the victim is in an enclosed space and a self-contained breathing apparatus is not used or the scene is not rapidly ventilated.^{10,11}

This case also highlights the important issue of Internet sites advising on suicide methodology. The existence of suicide instructional material has been shown to influence suicide methods without affecting the overall suicide rate.^{5,12} However, this availability may discourage people from seeking other alternatives. There are more than 100,000 websites about suicide, many of which condone suicide and/or do not offer sources of alternative information, such as counseling. Research has suggested that individuals who access the Internet may be psychologically more vulnerable and exhibit higher risk-taking behavior, substance abuse, and depression. Most of these individuals are 14 to 24 years of age, a group having a higher suicide rate and lower peer support.¹³ Since the victim in our case obtained the information and instructions about how to carry this out by using the Internet, there

is some concern that this method may become more commonplace. Motivation for the use of suffocating gas by some victims may be the misconception that the gas is poisonous.² In fact, there must be some question about how many suicides have already been performed in this manner but have not yet been added to the current literature.

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REFERENCES

1. Downs J, Conradi S, Nichols C. Suicide by environmental hypoxia (forced depletion of oxygen). *Am J Forensic Med Pathol.* 1994;15:216–223.
2. Avis P, Archibald J. Asphyxial suicide by propane inhalation and plastic bag suffocation. *J Forensic Sci.* 1994;39:253–256.
3. Knight B. *Forensic Pathology.* New York, NY: Oxford University Press; 1996.
4. Yoshitome K, Ishikawa T, Ishizu H, et al. A case of suffocation by an advertising balloon filled with pure helium gas. *Acta Med Okayama.* 2002;56:53–55.
5. Ogden RD, Wooten RH. Asphyxial suicide with helium and a plastic bag. *Am J Forensic Med Pathol.* 2002;23:234–237.
6. Spitz WU. Asphyxia. In: *Spitz and Fisher's Medicolegal Investigation of Death: Guidelines for the Application of Pathology to Crime Investigation.* 3rd ed. Springfield, ILL: Charles C. Thomas; 1993:444–497.
7. DiMaio DJ, DiMaio VJM. Asphyxia. In: *Forensic Pathology.* CRC Press; 1993:207–251.
8. Hiss J, Kahana T, Arensburg B. Suicidal asphyxia by gas mask. *Am J Forensic Med Pathol.* 1994;15:213–215.
9. How to kill yourself: a meta-guide [Church of Euthanasia web site] Available at: <http://www.churchofeuthanasia.org/metaguide.html>. Accessed March 22, 2002.
10. Hazard report: asphyxiation hazards when using anoxic cryogens. *Health Devices.* 2001;30:372–374.
11. Helium safety, chemistry, and management [lsu.edu web site] Available at: <http://www.camd.lsu.edu/msds/h/helium.htm>. Accessed March 22, 2002.
12. Marzuk PM, Tardiff K, Hirsch CS, et al. Increase in suicide by asphyxiation in New York City after the publication of *Final Exit.* *N Engl J Med.* 1993;329:1508–1510.
13. Dobson R. Internet sites may encourage suicide. *BMJ.* 1999;319:337.
14. Avis SP. An unusual suicide: the importance of the scene investigation. *Am J Forensic Med Pathol.* 1993;14:145–50.
15. How to kill yourself [Church of Euthanasia web site]. Available at: <http://www.churchofeuthanasia.org/resources/howtodie.html>. Accessed March 22, 2002.
16. Higgins J, Guillen J, Aldrete J. The effect of helium inhalation on asphyxia in dogs. *J Thorac Cardiovasc Surg.* 1971;61:870–874.