

Toxicological findings in helium deaths 2005-2010

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Final exit: The practicalities of self-deliverance and assisted suicide for the dying

Derek Humphry assisted his wife in taking a fatal drug overdose after she suffered declining health due to terminal cancer. He wrote the book *Final Exit* ¹ in 1991 as a guide to others in similar situations. *Final Exit* sparked a debate surrounding self-deliverance, assisted suicide and euthanasia which remains a contentious topic both morally and legally.

The 3rd edition of *Final Exit*, which was updated in April 2010 ², contains a comprehensive set of instructions on how to take a life using helium, stating that death should occur in approximately five minutes. The chapter begins by informing the reader to purchase two cylinders of helium from a toy shop, and that using cash is advisable to avoid later investigations. The process is described with the aid of diagrams and it is recommended that the 'patient' practices before the final attempt – there is a video available to purchase if required.

Interestingly, the author discusses the fact that so long as there are no bag marks on the neck, it should be possible to clear away the bag and cylinder, wait an hour or two and then call for a doctor as if the natural disease state has finally caused the individual's inevitable death.

It is by definition unknown how many deaths may have occurred in such circumstances and have been attributed to the disease state with little investigation. Similarly it will never be known how many instances there might be of carers deliberately taking the lives of fairly helpless individuals when no expression of consent has been given (the carer may perform this murderous act for gain, or consider it an act of ultimate kindness, depending on the circumstances).

There are now many books and websites available on assisted suicide, and inevitably individuals who are depressive and suicidal (but are otherwise expected to live long lives) have access to these materials and appear to be following the guidance. This review of toxicological findings was performed in order to determine whether there are any trends in the data which may be of significance.

Deaths involving helium

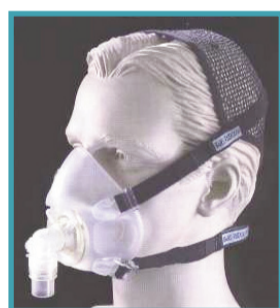


The number of cases of individuals being discovered with plastic bags over their head and empty helium cylinders beside them has increased dramatically in the last few years. According to a report recently published by St. George's University ³, the number of helium-related deaths more than tripled between 2006 and 2008. There were 25 recorded cases of death involving helium in the UK in 2008, and 89% of these were deemed to be suicide. The remaining 11% of deaths were given open verdicts by HM Coroner.

Overall, the report indicates that 80% of helium deaths occur in males, with most being aged 20-39 years old. It calls for consideration of the need to raise awareness of this issue and to perform further detailed research.

Toxicity of helium

Helium is a colourless, odourless and tasteless inert gas which can be readily purchased from toy shops for filling balloons.



Brief unconsciousness following inhalation of helium from balloons to distort the voice can be readily observed in numerous videos on the website YouTube ⁴. Breathing helium in an enclosed atmosphere (such as with a bag over the head) can very rapidly cause death due to asphyxia, as witnessed by Russel Ogden in his 2010 paper ⁵. It is thought that the individual feels no sense of suffocation as there is no increased production of carbon dioxide which would cause such an experience.

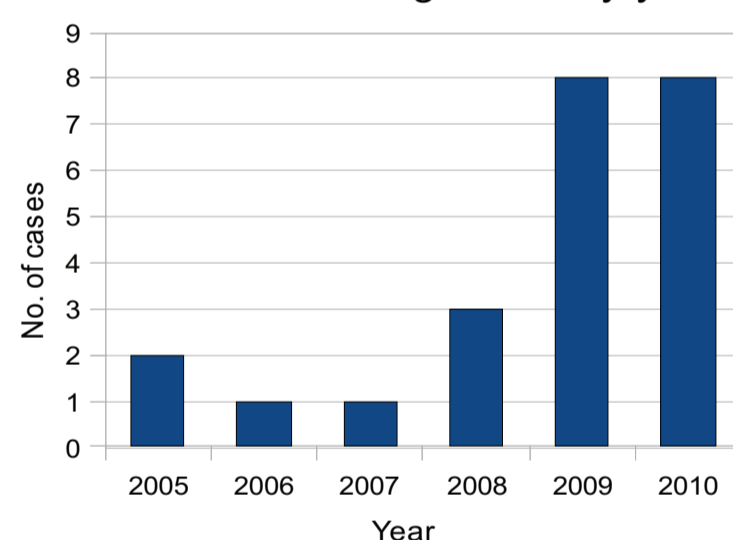
Since there is no accumulation of the gas in the body, concentrations in the body after death would be expected to be low. More importantly, given that helium is found in low concentrations in the air, and that it is commonly used as a carrier gas in gas chromatographic analysis, most toxicology laboratories cannot perform an analysis for helium. Pathologists must rely on circumstantial evidence to give a cause of death related to helium, as there are no distinctive pathological signs in asphyxial deaths ⁵.

Toxicological findings in post-mortem cases involving helium

Whilst LGC Forensics does not have the capability to analyse for helium, in many instances we have been asked to perform a range of routine analyses in order to determine if other drugs/substances played a role in the death or may have influenced behaviour or state of mind.

- A total of 23 cases potentially involving helium have been submitted to LGC Forensics over the period of 2005-2010 with the following distribution:

No. of cases involving helium by year



NB: The two cases received in 2005 were linked (possible suicide pact), and two of the cases received in 2009 were linked (possible suicide pact of a married couple).

- 18 of the deaths were male, with the remaining five being female, which is unsurprising given that the older data held by HM Coroner on these cases are likely to have been included in the report compiled by Ghodse et al. It should be noted that of the five females, two of these appear to have died in suicide pacts with a male.
- 14 of the individuals had access to or were prescribed medication, and nine of these were prescribed at least one anti-depressant or anti-psychotic drug.
- In nine cases there was no prescribed medication or no details were known.

- The drugs available to the individuals are shown in the table below.

| Available drug | No. of cases |
|--------------------------------|--------------|
| Antidepressants | |
| Chlorpromazine | 1 |
| Escitalopram | 1 |
| Fluoxetine | 1 |
| Mirtazapine | 3 |
| Paroxetine | 1 |
| Sertraline | 1 |
| Anti-Psychotics | |
| Lithium | 1 |
| Olanzapine | 1 |
| Risperidone | 2 |
| Benzodiazepines/Related | |
| Clonazepam | 1 |
| Diazepam | 7 |
| Temazepam | 2 |
| Zopiclone | 3 |
| Others | |
| Amlodipine | 1 |
| Desloratidine | 1 |
| Lamotrigine | 2 |
| Pregabalin | 1 |
| Simvastatin | 1 |
| Sodium Valproate | 1 |

- Interestingly, diazepam was by far the most common drug prescribed or available to the individuals, and the most commonly prescribed group of drugs were the benzodiazepines (including zopiclone). Overall, those prescribed medication were shown to be largely compliant with their prescription.
- Of the 23 cases analysed, only one (in 2005) involved an elevated concentration of drug – temazepam at 0.60 mg/L along with alcohol at 197 mg/100mL. In total six cases contained alcohol at a concentration considered to indicate consumption (rather than post-mortem microbial production), however the concentration was only greater than 200 mg/100mL in two cases.
- Overall, these findings appear to indicate that individuals choosing to commit suicide by inhalation of helium are quite closely following the advice given in *Final Exit*, and that it is not considered necessary to take an oral overdose of drugs in addition to the helium.

The future

It is likely that the number of helium-related deaths will continue to rise as knowledge of its apparent ease and effectiveness as an asphyxiant is increased in the general population. Whilst males aged 20-39 represent the majority of helium-related deaths to date, there are insufficient data available to accurately define an 'at-risk' group or individual profile at this stage.

Initially it would be useful to raise awareness of assisted suicide using helium in those investigating deaths, so that as many cases as possible are accurately identified as such. The capability for direct analysis for helium may also be required in the future for those cases in which there has been a concerted effort to clear away the evidence before reporting the death.

References

- Humphry, D., *Final Exit: The Practicalities of Self-Deliverance and Assisted Suicide for the Dying*, 1st ed. Hemlock Society, 1991.
- Humphry, D., *Final Exit: The Practicalities of Self-Deliverance and Assisted Suicide for the Dying*, 3rd ed. New York, NY: Delta; 2002.
- Ghodse, H., Ahmed, K., Corkery, J., Naidoo, V. and Schifano, F. Trends in UK deaths associated with volatile substances, 1971-2008 Report 23. Volatile Substance Abuse (VSA) Mortality Project, International Centre for Drug Policy (ICDP), St George's University of London.
- [www.youtube.com](http://www.youtube.com/watch?v=ufS690x8wdQ) for example "Helium Girl" added 14 December 2006, available at <http://www.youtube.com/watch?v=ufS690x8wdQ>. Accessed 16 November 2010.
- Ogden, R.D., Observation of Two Suicides by Helium Inhalation in a Prefilled Environment, *Am J Forensic Med Pathol* 2010;31: 156-161.