



G148 Cause of Death—Acute Alcohol Poisoning, Manner of Death—Suicide: A Case Study

George S. Behonick, PhD*, and Kevin G. Shanks, BS, AIT Laboratories, 2265 Executive Dr, Indianapolis, IN 46241; Robert Kulhanek, 2422 North 7th St, Sheboygan, WI 53083; and Mark J. Witeck, MD, 6826-91st Ave, Kenosha, WI 53142-7651

After attending this presentation, attendees will understand the importance of alternative or secondary specimens collected at autopsy for the toxicological analyses of volatile compounds, most notably, ethyl alcohol or ethanol. The case data represents exceptionally high alcohol concentrations in heart blood and vitreous humor within the context of the death scene investigation and autopsy findings. Interpretive considerations when evaluating unusually high blood and vitreous humor alcohol concentrations, with special attention directed to possible explanations for the findings based on the decedent's history and scene investigation, are included in the case study.

This presentation will impact the forensic science community by showing the significance and importance of a complete, competent medicolegal death investigation integrated within a diligent scene investigation, an autopsy with appropriate collection of primary and alternative specimens for toxicological study, and most importantly, the collaborative work effort of medical death investigators, forensic pathologists, and forensic toxicologists.

Acute alcohol poisoning is a frequent cause of death classification; however, it is rare when a decedent willingly and intentionally initiates a heavy bout of drinking with the sole purpose of consummating a life-ending act. The case is an 85-year-old male found deceased, sitting upright in a chair, in a ground floor room of his private residence. The witness, who reported the death, stated the decedent was sitting in the same manner two days before; the relative believed the man to be asleep and did not want to disturb him. The witness confirmed the decedent alive three days before but apparently in a state of distress; he also appeared to have been intoxicated and crying. His family history was notable for the death of his spouse approximately six weeks earlier. Investigation at the scene revealed a hand-written note simply stating "good bye." Further, two books found in the residence (*Final Exit* and *The Peaceful Pill Handbook*) extolling the practicalities of "self-deliverance" strongly suggested ideation on the part of the decedent. Additional evidence collected from the scene included a store receipt for a 1.75 liter bottle of vodka with a purchase date of three days prior to discovery of the body. Investigators discovered an empty vodka bottle under a bed in an upstairs room. External examination of the body indicated rigor, lividity, and skin slippage to be consistent with a postmortem interval of three days. Remarkable findings at autopsy included severe plaquing of the coronary arteries and aorta, a partially calcified aortic valve, moderate plaquing in the cerebral arteries within the Circle of Willis, notable cystic changes in the kidneys, and pulmonary edema. Autopsy noted moderate decomposition of the body along with an absence of significant injury capable of causing or contributing to death. Specimens for toxicological analyses collected at autopsy included heart blood and vitreous humour. The analyses consisted of volatile compounds by headspace gas chromatography in blood and vitreous humour and a comprehensive screen (more than 300 compounds) in blood by Ultra Performance Liquid Chromatography coupled to Time of Flight Mass Spectrometry (UPLC/ToF-MS). The results of the volatiles analyses indicated alcohol concentrations (weight by volume) of 1.605% and 0.893% in blood and vitreous humour, respectively.

Previous studies in cases involving unusually high alcohol concentrations demonstrated a mean blood alcohol concentration of 0.74%, with a range 0.42 – 1.77%. A report also indicates a 55-year-old male achieving a blood alcohol concentration of 1.13% (w/v) in a suicide gesture averted by supportive therapy.¹ This case study explores the plausibility of achieving the alcohol concentrations reported for heart blood and vitreous humor and includes discussion of other factors (diffusion, postmortem neo-formation secondary to decomposition) to consider when interpreting the results.

Reference:

- ¹ *In: Disposition of Toxic Drugs and Chemicals in Man*, 9th ed., Randall C. Baselt, Biomedical Publications, Seal Beach, California, 2011

Ethanol, Poisoning, Suicide