K42 Suicide by Inhalation of Freons: Detection of in a Partially Decomposed Body

Eli J. Piatigorsky, MD, Coroner's Office, Olmsted County, Anatomic Pathology, Hilton 11, 200 First Street SW , Rochester, MN 55905; Lawrence E. Ebnet, BSc, and Thomas P. Moyer, PhD, Mayo Clinic, Toxicology Laboratory, Department of Laboratory Medicine and Pathology, Hilton 730, 200 First Street SW, Rochester, MN 55905; Eric A. Pfeifer, MD, Coroner's Office, Olmsted County, Anatomic Pathology, Hilton 11, 200 First Street SW, Rochester, MN 55905; and Loralie J. Langman, PhD, Mayo Clinic, Toxicology Laboratory, Department of Laboratory Medicine and Pathology, Hilton 730, 200 First Street SW, Rochester, MN 55905*

The goals of this presentation are to present an unusual mechanism of suicide by freons inhalation and present a method for detection of freons in body fluids and tissues.

This presentation will impact the forensic community and/or humanity by demonstrating an unusual method of suicide and demonstrates that detection of volatile freons can still be achieved in a partially decomposed body.

This case describes a fatality due to suicidal inhalation of two widely available refrigerant gases: chlorodifluoromethane (HCFC-22) and 1,1,1,2tetrafluoroethane (HFC-134a), a combination that has not been previously reported in forensic literature. A 51-year-old white man was found dead at home in the bathroom on the floor in a large plastic trash bag that covered the entire body. Two commercial 30-pound gas tanks containing the gases were suspended with two separate plastic tubes connected to the valves of the tanks that were running into the bag. The valves on both tanks were fully opened. The deceased was in an early generalized state of decomposition. There are no reports in forensic literature describing detection of refrigerants in a partially decomposed human body. Volatile gas analysis was performed using gas chromatography mass spectrometry. The chromatographic column used was a HP-5 MS capillary column (cross-linked 5% phenyl-methylsilicone, 30 meter length, 0.25 mm internal diameter, 0.25 um film thickness). Aliquots of the biological samples (1 gram of tissue, 1.0 ml of blood and bile) were sealed in 2 ml glass vials and heated at 30^{O}C for 30 minutes; 50 uL of the headspace gas was aspirated from each vial and injected into the GC/MS system. The retention times of HCFC-22 and HFC-134a were nearly identical, 1.76 and 1.78 minutes, respectively. A full scan of commercially purchased standards identified the ions unique to the compounds. A full scan of the peak showed all major ions of both compounds were identified in the following specimens: blood, bile, liver, spleen, heart muscle, thigh muscle, subcutaneous fat, brain, kidney, lung, pancreas, spinal cord, and thyroid. The relative amount of each gas in the samples was determined by comparison to the peak area obtained from injection of precise volumes of the 98% pure gas using the following ions in SIM mode (HCFC-22, 67, 85, 47, and HFC-134a 83, 63). The ratio of HCFC-22 and HFC-134a ranged from 1.4 in muscle to 4.0 in liver.

Freons, GC/MS, Suicide

 ** Presenting Author*