CASE NOTES #2: AN UNUSUAL FINDING OF 1,1-DIFLUOROETHANE IN A DROWNING VICTIM

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1,1-Difluoroethane (HFC-152a), is a colorless, flammable gas with a slight ethereal odor, is used as a non-ozone depleting aerosol propellant and as an alternative to trichlorofluoromethane (CFC-11) and dichlorodifluoromethane (CFC-12) in foam applications.(1) It is also commonly found in electronic cleaning products, and many consumer aerosol products that must meet stringent volatile organic compound (VOC) requirements.

Since Broussard(2) first reported the deaths of a driver and passenger in a motor vehicle accident, the forensic literature has had a steady increase in the number of reports of this compound relating to driving impairment with and without fatal outcomes (3-6). There are additional reports of sudden deaths involving this substance (7-9).

We report here what we believe to be the first involvement of 1,1-difluoroethane in a drowning.

The decedent was a 33-year-old male reported missing by his wife six hours after going kayaking and scuba diving. His body was discovered by a police helicopter floating in a river and he was pronounced dead approximately 9 ½ hours after being last seen alive. He was dressed in a wet suit, fins mask and snorkel. His past medical history included an occasional complaint of chest pain. He was also known to use "energy" drinks.

Specimens submitted to the toxicology laboratory included blood (collection site not specified), urine, bile, gastric content, liver, kidney and brain.

The blood was tested by headspace gas chromatography for ethanol and other volatiles, and colorimetrically for the presence of carbon monoxide and cyanide. Urine was tested by immunoassay for common drugs of abuse and colorimetrically for salicylates, acetaminophen, phenothiazines, ethchlorvynol and chloral hydrate.

Positive findings were an unidentified peak on both BAC-1 and BAC-2 columns (RRT of 0.4342 verses n-propanol on BAC-1 and RRT of 0.4956 verses n-propanol on BAC-2). There were no retention time/relative retention time matches with Restek's application note (10), thus a sample of 1,1-difluoroethane with n-propanol was subjected to our headspace alcohols procedure. The 1,1-difluoroethane peaks were at the same retention times as the unidentified peak and a blood aliquot was sent to a reference laboratory for confirmation and quantitation by GC/MS. The result was the 1,1-difluoroethane was present at a concentration of 43 mg/L. Financial considerations precluded testing in other fluids and tissues. The only other significant positive finding was acetaminophen at 22 mg/L.

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