K27 The Use of Hair Analysis in Postmortem Toxicology to Aid in the Determination of Cause of Death

Bryan Casto, MD, Heather Wogoman, BS, Russell Uptegrove, MD, Laureen J. Marinetti, PhD, Steve Bultman, BS, and Roy Smith, MS, Montgomery County Coroner's Office, 361 West Third Street, Dayton, OH 45402*

After attending this presentation, attendees will understand the potential use of hair analysis to aid in cause of death determinations.

The victim was found unresponsive and was transported to the emergency room via ambulance. Upon presentation to the emergency room on 4/14/XX at 0452 hours, the victim was in cardiac arrest with hypoxic ischemic encephalopathy, secondary to a possible drug overdose. The victim was transferred to the ICU and on 4/15/XX the parents signed a withdrawal of care form. On 4/18/XX at 0430 hours the victim was pronounced dead.

The MCCO was not notified of the death until 4/25/XX at 1435 hours. After review of the medical records and police reports MCCO requested an exhumation of the body and an autopsy was performed. Based on police reports, the decedent was a known heroin abuser. Autopsy results were remarkable for mild cerebral edema and histologic confirmation of hypoxic brain injury and diffuse ischemic injury within the liver.

The toxicology laboratory at MCCO received the following specimens; peripheral blood (1 mL), abdominal inferior vena cava and portal venous blood (35 mL), brain, cerebrospinal fluid (CSF), gastric, liver, muscle, urine (trace), vitreous fluid, bile and head hair. The specimens were from an embalmed body and there was no hospital admission blood available. Analysis of the bile and blood revealed the presence of lorazepam and midazolam. Analysis of the blood and the vitreous for opiates revealed the presence of free morphine. During the decedent's hospital course lorazepam, midazolam and morphine was administered.

Analysis of the hair was performed in an attempt to document the presence of 6-monoacetylmorphine (6-MAM), a marker of heroin use. Hair analysis was accomplished using a combination of two published methods, Welch et al., (1993) and United Chemical Technologies (UCT) Inc., in conjunction with in house development. The hair was prepared for analysis using the Welch method and was extracted by solid phase extraction (SPE) using UCT method. A blank hair matrix was also analyzed.

Hair analysis revealed the presence of 6-MAM, codeine, morphine and oxycodone. Allegations later arose which indicated that the manner of death in this case may be homicide. These allegations are still under investigation at this time. In light of the decedents' history in combination with an autopsy revealing no evidence of traumatic injury, the cause of death was determined to be acute heroin intoxication. Hair analysis played a key role in confirming previous heroin exposure thus enabling cause of death determination.

Opiates, Hair Analysis, Postmortem Toxicology

Copyright 20?? by the AAFS. Unless stated otherwise, noncommercial *photocopying* of editorial published in this periodical is permitted by AAFS. Permission to reprint, publish, or otherwise reproduce such material in any form other than photocopying must be obtained by AAFS. ** Presenting Author*