



## Pathology Biology Section – 2006

### G94 The Value of Expanded Postmortem Toxicology Testing Menu

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After attending this presentation, attendees will understand the value of retaining alternative tissues for postmortem toxicological analyses.

This presentation will impact the forensic community and/or humanity by demonstrating the utility of alternative postmortem tissue analysis in determining defensible cause of death.

The objective of this presentation is to relate experiences from the Harris County Medical Examiner's Office regarding use of brain tissue, as a supplement to blood, for the postmortem identification of cocaine and its metabolites.

First reported by Spiehler and Reed in 1985 (1), and then further clarified by Karch in 1998 (2), the concentrations of cocaine (COC) and benzoyllecognine (BE) in brain parenchymal tissue are vital components to a defensible cause of death due to cocaine intoxication.

Over a 16-month period, in Harris County, there were 58 cases initially designated as undetermined but were suspected of being cocaine-associated deaths. Brain tissue from each of these cases had been obtained as part of the routine autopsy protocol at the time of necropsy. Due either to insufficient quantity, the complete lack or poor quality, of blood specimens taken from these cases, the traditional blood analyses did not identify COC or its metabolites and did not contribute to the determination of cause or manner of death. Subsequently, the brain tissue was analyzed for the presence of COC, BE, and/or cocaethylene (CE). Of the 58 cases analyzed, 35 (60%) COC, BE, and/or CE was found in the brain tissue. As a result, 35 cases that would potentially have been classified as undetermined could be closed and signed out as cocaine-associated deaths.

While the analysis of brain tissue should not be considered as a routine procedure, the collection of parenchymal tissue (e.g., brain) should be incorporated as part of the autopsy procedure. Even if not actually analyzed, this tissue may prove to be invaluable when more routine analyses prove to be non-contributory to the cause of death determination. Other solid tissues or alternative specimens such as hair, nail clippings, maggots, and other solid organs are proving to be useful in postmortem toxicological analyses.

In conclusion, the Harris County Medical Examiner's Office has observed the utility of alternative specimens, such as brain, in the determination of cause in cocaine-related, or suspected, deaths.

#### **References:**

1. Spiehler VR, Reed D, Brain Concentrations of Cocaine and Benzoyllecognine in Fatal Cases, *Jour Foren Sci*, 1985, 30(4):1003-1001.
2. Karch SB, Hearn L, Mash D, and Rutenber J, Postmortem Diagnosis of Cocaine Toxicity: The Utility of Brain Concentration Measurements, SOFT-TIAFT Meeting, October 1998, Albuquerque, NM.

#### **Cocaine, Alternative Tissue Testing, Cause of Death**