



### **G65 Postmortem Whole Body Computed Tomography of Heroin and Methadone Abusers: First Results**

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The goal of this presentation is to detect and to learn about characteristic findings in postmortem imaging in cases associated with heroin or methadone poisoning.

This presentation will impact the forensic science community by showing how Multi-Slice Computed Tomography (MSCT) implemented in the diagnostic work-up algorithm of deaths associated with consumption of heroin and methadone might be a helpful tool to improve the daily work of forensic pathologists.

Illegal drug consumption remains an important issue in forensic pathology. Abuse of and ultimately intoxication with heroin and methadone is a frequent cause of death in young adults. Postmortem CT imaging plays an increasing role in the diagnostic workup in forensic pathology.

The purpose of this study was to assess and to analyze the findings in postmortem, full-body MSCT in victims of deaths where heroin and methadone intoxication played a role.

Routinely performed whole-body MSCT scans of 32 cases of non-traumatic death (16 women; 16 men; median age 38 years; range 26-63 years) who tested positive for heroin or methadone consumption by toxicology were retrospectively evaluated. Whole-body MSCT data were analyzed for pathologic findings as well as the images of an age- and sex-matched control group (n=29, 16 women; 13 men; median age 37.5 years).

Nine of the 32 cases were associated with a consumption of heroin in combination with methadone. In six cases, methadone was found to be the only consumed drug. In four cases, heroin was the only detected drug. In a majority of the cases (56%), a mixture of heroin, methadone, benzodiazepines, cocaine, or amphetamines was found.

Most common findings in the drug cases were: pulmonary edema 22 (69%), distended urinary bladder 14 (44%), cerebral edema (9 cases, 28%), aspiration (7 cases, 23%), pulmonary infection (5 cases, 16%), pulmonary emphysema (5 cases, 16%).

In the control group, a remarkable lower number of the six most common findings detected by CT in the heroin and methadone group was found in pulmonary edema (28%), distended urinary bladder (14%), pulmonary infection (3%), and in pulmonary emphysema (3%). Findings of aspiration (21%) and cerebral edema (28%) were almost similar to the heroin/methadone group.

The combination of lung and brain edema with a full bladder was seen in the heroin/methadone group in six cases (19%), whereas this combination was found in the control group in only one case (3%).

This study demonstrates characteristic findings of postmortem whole body MSCT in cases of heroin and methadone abusers. Furthermore, the combination of MSCT findings of a distended urinary bladder, edema of brain and lungs appears to be more specific than originally assumed, however much not very sensitive. Their combination should raise suspicion of intoxication even though some of the cases contained, but were not judged to have died of, heroin and/or methadone. While this appears to be well known in forensic pathology, new synthetic drugs that might not show up on toxicology screening tests in conjunction with restricted resources for routine toxicology might put an additional burden on forensic pathologists to argue case angles of possible poisoning based on evidence.

These preliminary results are promising regarding the value of postmortem imaging in deceased persons associated with heroin or methadone consumption. A future step is to evaluate the number and types of findings in larger studies.

**Forensic Radiology, Computed Tomography, Drug Abuse**