H169 Using Postmortem Computed Tomography (PMCT) and Drug Screens to Triage Drug-Related Fatalities

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Learning Overview: The goal of this presentation is to present a novel method to triage drug-related death examinations using PMCT and drug screening.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing an alternative approach to managing the increasing numbers of drug-related deaths in a medical examiner's office without compromising accuracy.

Background: In the current context of rising numbers of drug-related fatalities and an overall shortage of forensic pathologists, the current National Association of Medical Examiner (NAME) recommendation that all drug-related fatalities receive a full autopsy may not be the most efficient use of increasingly limited resources. The New Mexico Office of the Medical Investigator (OMI) has devised a new triaging system using a combination of PMCT and drug screens to help alleviate some of the workload while still providing quality care.

Methods: Under the new guidelines, drug-related fatalities fall into one of five categories.

Scenario 1: The first category pertains to decedents 40 year old and younger, with no medical history, a scene suggestive of drug use, and a negative PMCT. If all of these criteria are met, the case is then triaged based on the results of a Urine Drug Screen (UDS), with a positive screen resulting in a conversion to external examination and a negative screen resulting in an autopsy.

Scenario 2: This category includes decedents with significant natural disease, regardless of age, or those that would meet the criteria for an external examination based on age or significant PMCT findings, but who also have some indicators for drug involvement based on history or scene findings. These cases may still receive an external examination with PMCT to document natural disease. A UDS is used in these cases to guide toxicology testing: a positive screen resulting in testing compatible with the positive screen and a negative screen resulting in no additional testing.

Scenario 3: The third category addresses decedents with lethal natural disease (i.e., hemopericardium) seen on PMCT or autopsy. The examination type depends on the modality by which the lethal natural disease is discovered. If found on PMCT, an external examination is appropriate. If found at autopsy, the exam type does not change. A UDS is used to guide toxicology testing (i.e., rule out drug involvement).

Scenario 4: The fourth category includes decedents with chronic ethanol abuse and significant natural sequelae of such on PMCT, but with some concern for acute ethanol toxicity. These cases may receive an external examination with confirmatory toxicology testing.

Scenario 5: The last category relates to all other drug-related deaths that do not fit into the first four categories (i.e., suicidal overdoses). At this time, these cases still receive a full autopsy.

Results: Within the period of May 2019 to July 2019, 150 cases were identified as meeting the criteria for one of the first four categories. These cases were triaged according to the above guidelines. During this time period, confirmatory toxicology testing was performed on all cases, regardless of drug screen results. Of those 150 cases, 124 (82%) were converted to external examinations with PMCT. A majority of these cases, 60%, were in Scenario 2, while 34% were in Scenario 1, and the remainder consists of Scenario 3 and 4. Drug screens were performed on 75% of the cases. For those cases with both a UDS and confirmatory toxicologic testing, sensitivity by drug category ranged from 75% to 100%, and specificity ranged from 77% to 100%. To date, of the cases that have been finalized, the UDS was in agreement with cause of death in all but one case. In this instance, the UDS was positive for known medications at therapeutic concentrations, which were determined not to have contributed to death.

Discussion: The conversion of 124 of 150 cases to external examinations resulted in an autopsy equivalent decrease from 150 to 57 (when using four external exams per autopsy equivalent). This is not only a significant reduction in workload per pathologist, helping maintain NAME guidelines for numbers of autopsies performed per year, but also reduced technologist labor and morgue resources. Additionally, in nearly 11% of cases with UDS, the drug screens were negative with negative confirmatory testing. In the future, these cases would not have needed confirmatory testing, reducing the cost of toxicology testing overall. The combination of PMCT and drug screens allows for a novel triaging system in which a full autopsy is not necessary for all drug-related deaths, decreasing workload while still maintaining accurate determination of cause and manner of death.

Postmortem Computed Tomography, Drug Screen, Autopsy