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Evaluation of Medicolegal Investigators' Suspicions and Positive Toxicology Findings in 100 Drug Deaths

REFERENCE: Ernst, M. F., Poklis, A., and Gantner, G. E., **"Evaluation of Medicolegal Investigators' Suspicions and Positive Toxicology Findings in 100 Drug Deaths,"** *Journal of Forensic Sciences,* JFSCA, Vol. 27, No. 1, Jan. 1982, pp. 61-65.

ABSTRACT: The performance of trained medicolegal investigators was evaluated in 100 consecutive drug deaths, which occurred from January 1978 to May 1980 in St. Louis City and County. Carbon monoxide deaths were excluded from the study. The toxic agent responsible for death, as indicated by scene investigators and the decendent's drug history, was compared to the actual toxicology laboratory findings. In 84 of the cases, the toxicant was correctly indicated by the investigators. In the remaining 16 cases, 12 were suspected to be drug deaths but the major toxicant was not indicated, and in 4 cases no drugs were suspected. The manner of death had no influence on the investigators' performance. This study demonstrates the value of trained medicolegal investigators in providing helpful information to the pathologist and toxicologist before autopsy and laboratory analyses in cases of drug deaths.

KEYWORDS: toxicology, pathology and biology, deaths, medicolegal investigators

It is the responsibility of the medical examiner/coroner to determine both the cause and the manner of death of any person who dies under circumstances indicating a possible accident, homicide, or suicide or in the absence of medical care. In the ideal situation, the medicolegal investigator will provide the medical examiner/coroner with all pertinent information regarding the circumstances of the death and the decedent's medical history before the autopsy. Such information can be valuable in establishing the cause of death and, in particular, has great influence on the verdict in the death [*1*].

During the past decade, drugs have played an increasing role in sudden and violent deaths. Information as to the drugs or poisons that had been available to the decedent may alert the pathologist to the possibility that a "drug death" has occurred. This information can also save the toxicology laboratory time, effort, and expense in performing postmortem analyses [*2*].

This communication presents a retrospective study of the correlation of medicolegal investigators' suspicions regarding the major toxicant and the toxicology findings in 100 drug deaths.

Presented at the 33rd Annual Meeting of the American Academy of Forensic Sciences, Los Angeles, CA, 18 Feb. 1981. Received for publication 9 April 1981; revised manuscript received 13 July 1981; accepted for publication 16 July 1981.

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Study Protocol

The performance of trained medicolegal investigators was evaluated by reviewing 100 consecutive drug deaths that occurred from January 1978 to May 1980 and were investigated by the Medical Examiner's Offices of the City of St. Louis and St. Louis County, Missouri. The toxic agent responsible for death in each case as indicated by the investigator's report was compared to the actual toxicology laboratory findings.

Information pertaining to the identity of the toxicant was developed from three sources: (1) medicine/alcoholic beverage containers found at the scene of death; (2) information given by family or friends during interviews; and (3) medical history received from the deceased's physician, medical records, or medical personnel of emergency care units or hospital facilities.

For this study, it was important to distinguish between "drug deaths" and "drug-related deaths" [3]. A drug death was defined as a death resulting from a drug in an inappropriate quantity causing an intoxication that was the proximate cause of death. A drug-related death was defined as an instance in which drugs played a significant role in the circumstances surrounding a death but were not the proximate cause of death. Drug-related deaths and fatal exposures to carbon monoxide were excluded from this study.

Results and Discussion

In 84 of the 100 cases, the toxicant was correctly indicated by the investigators.

A trained medicolegal investigator responded to the death scene in 37% of the deaths reported (31 cases). Thirty percent of the deaths (25 cases) were investigated by the police at the scene and the remaining 33% (28 cases) were reported by hospital personnel. Although some information was initially accumulated by law enforcement or hospital personnel, it was reviewed by the trained medicolegal investigator and deemed to be of sufficient factual importance to be indicative of the intoxicant.

The sources of information that enabled the investigator to correctly indicate the major toxicant in 84 of the deaths are presented in Table 1.

In 46 of the 84 cases, two of the three sources were instrumental in the investigators' ability to pinpoint the fatal intoxicant. In 13 cases, all three sources indicated the specific drug/substance causing the death. In 25 cases, only one of the three sources gave information that helped to determine the lethal agent.

In the remaining 16 cases, 12 were suspected to be drug deaths, but the major toxicant was not indicated. In 4 cases, a drug death was not suspected before the autopsy. If a body has been moved before the medical examiner has been notified of the death, it is the standard procedure of these offices not to send an investigator to the scene. For this reason, only 4 of these 16 cases were investigated at the scene by a medical examiner's agent.

Nine of the 16 "missed" cases occurred before the fall of 1978, when a formalized five-day training course, conducted by St. Louis University Division of Forensic and Environmental

TABLE 1—*Sources of information developed by investigators that resulted in correct identification of the lethal toxicant in 84 drug deaths.*

Source	Frequency	Percentage
Containers at death scene	71	85
Containers in same room	45	54
Information from family/friend	50	60
Medical history	34	40

Pathology, became a mandatory requirement for all investigators employed by the two medical examiner's systems.

The investigators' indication of the major toxicant in twelve of the suspected drug deaths is compared with toxicology laboratory findings in Table 2. The source of the misdirected suspicions is also given in Table 2.

Because of the policy previously stated, a trained medicolegal investigator did not go to the scene of these twelve deaths. In ten of these cases, information was supplied by the police who searched the scene, and in seven instances, confiscated medications. In three deaths, the police reported that no toxicants were found at the scene. The remaining two cases were reported by a medical facility and in neither instance were the medical personnel able to furnish any pertinent history of the use of drugs or poisons.

The four cases where medicolegal investigators went to the scene but did not indicate the possibility of a drug death are presented.

Case 1

A 33-year-old white female was found dead in bed by her husband on his return home from work. Next to the bed, the husband discovered a half-empty, 0.5-kg (1-lb) container of roach powder, a Styrofoam® cup containing some of the powder, and a spoon with portions of moistened powder adhering to the surface. Upon their arrival, the police informed the husband that the powder was of no consequence and suggested he dispose of it. The body was conveyed to the medical examiner's office and, at autopsy, revealed no gross or histologic

TABLE 2—*Cases in which drug death was suspected but major toxicant was not correctly indicated by investigators.*

Case	Suspected Toxicant	Reason for Suspicion	Toxicology Findings and Blood Concentrations, mg/L
78-888	ethanol	wine bottles	imipramine 37
78-1236	ergotamine; phenobarbital; aspirin, phenacetin, and caffeine mixture	prescription vials	tranylcypromine 1.5
78-6277	diazepam, ethanol, intipramine	prescription vials	amitriptyline 8.2
78-6326	unknown	unidentified tablets	pentobarbital 32
78-6685	amitriptyline; aspirin, phenacetin, and caffeine; codeine; diazepam; propoxyphene	prescription vials	ethanol 43[a] and secobarbital 30
79-687	methapyrilene, salicylamide	OTC[b] sleep-aid bottle	chlorpromazine 8.0
79-3415	unknown	known drug abuser	methylenedioxyamphetamine (MDA) 4.5
79-6916	ethanol	known alcoholic	secobarbital 18
79-7256	amitriptyline, chloral hydrate, chlordiazepoxide	prescription vials	imipramine 4.0
80-172	unknown	unidentified capsules	doxepin 17
80-1435	kerosine	paramedic reported kerosine breath	methanol 380[a]
80-7419	flurazepam, glutethimide, imipramine	prescription vials	ethanol 530[a]

[a] Concentration of volatile toxicants in mg/100 mL.
[b] OTC = over-the-counter medications.

explanation for death. Because of the negative autopsy, the laboratory initiated an extensive battery of analyses, which resulted in the detection of fluoride in the body fluids. As a result of these findings, the husband was again interviewed. He brought forth the items that he had found by his wife's bed and related his conversation with the police.

The fluoride concentrations were these: bile, 3.4 μg/mL; kidney, 16.0 μg/kg; liver, 8.6 μg/kg; urine, 290 μg/mL; and in the submitted stomach contents, 7 mg.

Case 2

A 26-year-old white male was found dead at home seated at his desk. No evidence of alcohol or drugs was found at the residence, and the body displayed no signs of trauma. The decedent was being treated on an outpatient basis at a state hospital for alcoholism. His last visit to the clinic had been nine days before his death. Toxicology laboratory findings were blood concentrations of ethanol of 180 mg/dL and of chlordiazepoxide, 37 mg/L.

Case 3

A 37-year-old white male was found dead on the floor of his room in a downtown rooming house. The decedent had a history of schizophrenia for which he had previously been hospitalized. No alcohol or medications were present at the scene. Autopsy findings were unremarkable. The toxicology laboratory reported a blood ethanol concentration of 420 mg/dL.

Case 4

A 24-year-old black female attired only in a pair of blue jeans was found dead behind a warehouse. Her wrists had apparently been tied together at one time as there was wire about one wrist and a linear indentation with a reddened area about the other. At this time, the police suspected a possible rape/homicide; however, the autopsy revealed no signs of trauma or recent sexual contact, but injection sites on both arms were noted. Toxicology findings were positive for both morphine and codeine. The decedent was a known prostitute and drug user; she apparently died from intravenous narcotism and her associates dumped her body. The wire may have served as a handle for carrying the body.

There was no relationship between the manner of death assigned to each case and the investigators' ability to identify the major toxicant causing death. The investigators were unable to state the correct toxicant in only 16% of each class ascribed to these cases: 9 out of 55 suicides, 3 out of 16 accidents, and 4 out of 25 open vedicts.

Summary

A retrospective study of 100 consecutive drug deaths occurring in St. Louis City and County showed that trained medicolegal investigators were able to correctly indicate that a drug death had occurred in 96% of the cases and that the investigators were able to correctly predict the major toxicant in 84% of these cases. In only four cases was a possible drug death not indicated prior to the autopsy. This study demonstrates the effectiveness and value of trained medicolegal investigators in providing information to assist in the determination of the cause and manner of death.

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