

Sudden Death During Arrest and Phencyclidine Intoxication

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Abstract: Deaths of individuals being arrested are important and complex medicolegal cases. Conclusions regarding the cause and manner of death for such cases must take into account multiple factors that may have played a role, as well as anticipate the forensic issues that will arise. In this article, we review the deaths of 2 individuals in which phencyclidine intoxication was a factor that contributed to death during arrest. Most cases of sudden death during arrest have involved cocaine intoxication; because phencyclidine's pharmacologic properties are quite different from those of cocaine, these cases allow for comparisons to those factors that may have greater importance.

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The sudden and unexpected death of individuals during arrest is important in medicolegal cases, which the community examines with concern and suspicion.^{1–3} Thorough investigation into the circumstances and complete autopsies with correlation of anatomic findings to these circumstances is critical in coming to appropriate conclusions.^{3,4} Typically, conclusions of police-custody deaths must take into account multiple factors that may have contributed to the deaths of the individuals.^{5,6} Toxicologic results are one such factor. This article reviews deaths during arrest for individuals whose postmortem toxicology demonstrated phencyclidine in blood samples recovered at autopsy in an effort to examine the effect other factors may have had in a particular case.

Cases of sudden death during arrest for individuals with phencyclidine-induced psychosis and delirium are strikingly absent in articles that review multiple cases of such events.^{5–10} Cocaine is frequently involved in cases of sudden death during arrest.^{3–12} Possible explanations for this disparity may be that phencyclidine's prevalence as a drug of abuse

had decreased substantially when these reviews occurred¹³ or that phencyclidine's pharmacologic properties do not frequently cause significant neurologic or cardiorespiratory changes that may lead to sudden unexpected death during arrest.¹⁴

Phencyclidine was initially used as an intravenous anesthetic agent that demonstrated great potential because it did not cause significant respiratory or cardiovascular depression.^{14,15} Patients administered phencyclidine, though, developed postanesthetic delirium and hallucinations, causing its use in medicine to cease in 1965.¹⁵ Phencyclidine drug abuse was prominent in the 1970s and 1980s but decreased in the 1990s.¹³ When individuals die during arrest, the police may consider phencyclidine as the reason for one's violent behavior, although this correlation between phencyclidine and violent psychotic episodes is unclear.^{16–18} We present 2 cases of 2 individuals with phencyclidine intoxication who died suddenly during arrest.

MATERIALS AND METHODS

The records at the Office of the Chief Medical Examiner for the state of Maryland were reviewed for deaths that occurred during police arrest during the 1990s. The jurisdiction includes 23 counties in the state, as well as Baltimore City. Autopsy files were reviewed, as were police and investigative reports. Autopsies were conducted in accordance with accepted forensic pathology standards, including complete autopsy examination, toxicologic studies, and consultations from other specialists as needed.

RESULTS

During the 10-year study period, 28 cases were reviewed, of which 2 cases were identified as deaths that occurred during arrest and involved phencyclidine intoxication. The 28 cases included 21 black men, 3 black women, 3 white men, and 1 Hispanic man. Toxicologic findings for the 28 cases concerning commonly abused drugs revealed 12 with cocaine intoxication, 4 with cocaine and morphine intoxication, 1 with morphine intoxication, and 2 with alcohol intoxication (greater than 0.1 g/dL). No cases were found with negative toxicologic results, although 1 case involved

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medications for cardiac life support (lidocaine and atropine) and 2, medications for psychotic behavior (haloperidol).

During this 10-year period, there were 969 cases in which cocaine contributed to death, and in 262 of these cases, the cause of death was attributed to cocaine alone. In contrast, there were 45 cases in which phencyclidine contributed to death. In 7 of the 45 cases, the cause of death was attributed to phencyclidine intoxication alone, and in 2 of the 45 cases, the individuals were being arrested at the time of death. The following 2 cases were of individuals who died during arrest; both were black males who were arrested in the same county outside of Washington, DC.

Case 1

Police responded to a disorderly call for an individual who had been ejected from a concert at a public arena. Witnesses described a 33-year-old man as displaying bizarre behavior and striking some concert attendees on the head. Security guards dragged him from the arena, and after a brief struggle, the subject was handcuffed behind the back and placed in the prone position on the ground by 3 security guards. After he apparently calmed down, he was seated upright in a police car to be transported to the police station for processing. On the way to the station, the individual continued to act irrationally and kicked out the windshield of the police car. He was then removed from the car and placed in a grassy area in the prone position. Soon after being placed in this position the individual continued to move but the movements were not as pronounced until he became unresponsive. Cardiopulmonary resuscitation was unsuccessful, and no vital signs or core body temperature was obtained. Investigation revealed no significant medical or psychiatric history.

Autopsy revealed a 114-kilogram man measuring 1.75 meters in length and with a protuberant abdomen. Multiple abrasions were present on the extremities and the front of the chest and abdomen. Petechial hemorrhages of the conjunctivae were present, and there was bloody frothy fluid in the mouth. The heart weighed 500 g, and the combined lung weight was 1150 g. There was no history of hypertension, and hypertensive cardiovascular disease was not established at autopsy. A neuropathology consultation was without significant findings. No evidence of a hematologic abnormality was noted at autopsy, and microscopically, no significant erythrocyte sickling was noted. Toxicologic analysis of blood revealed phencyclidine at 0.1 mg/L, alcohol at 0.04% (wt/vol) and diphenhydramine of 0.2 mg/L. No other drugs were detected. The death was certified as the cause of death being asphyxiation associated with phencyclidine intoxication and the manner of death as homicide.

Case 2

Police responded to a call about a disturbance involving a 31-year-old man. When police arrived, the man was found

lying in the street and yelling for no apparent reason. Police decided to detain the man for psychiatric evaluation. The man resisted, and after a minor struggle, police were able to handcuff the man and place leg irons on him. He was then lain prone on the back seat of the police car and transported to the area medical center. On arrival, the man was mumbling, and police and hospital security officers carried him into the emergency department and lay him prone on the floor in front of the triage desk. Minutes later, a nurse found him unresponsive with no vital signs; no body temperature was ever taken. Cardiopulmonary resuscitation was unsuccessful. Investigation revealed no significant medical or psychiatric history.

Autopsy revealed a 89-kilogram man measuring 1.75 meters in length. There were petechial hemorrhages of the palpebral conjunctivae, 6 located in the right eyelid and 1 in the left lower eyelid. Multiple abrasions were on the face and upper and lower extremities, with a laceration of the left palm. There was a contusion and superficial bite-mark lacerations of the tongue, consistent with terminal seizure activity. No seizure activity was ever reported by witnesses, and the decedent had no reported history of a seizure disorder. A neuropathology consultation was without significant findings. The heart weighed 480 g and the combined lung weight was 1350 g. No evidence of a hematologic abnormality was noted at autopsy, and microscopically, no significant erythrocyte sickling was noted. Toxicologic analysis revealed phencyclidine at 0.2 mg/L in the blood, and analysis of the urine revealed the presence of cocaine and its metabolites. The death was certified as the cause of death being acute phencyclidine intoxication with physical restraint and the manner of death as undetermined.

DISCUSSION

These 2 cases are typical of other cases reported in the literature in that the individuals arrested were disturbing the peace, requiring police response. In both cases, after a struggle the individuals were placed in a prone position and were subsequently found unresponsive. The injuries sustained were considered minor and could not alone explain death.

The perils of restraint deaths involving subjects with cocaine-induced delirium have been well documented.³⁻¹² The position of the body in the prone position with the ankles secured and bound to the handcuffs ("hogtied") initially had been considered a critical factor explaining sudden death,^{7,19} but further investigation has demonstrated that this position alone is not physiologically significant.²⁰⁻²¹ In fact, it was not until court proceedings that a leading proponent of body position in restraint cases retracted his opinion and agreed that the hogtied position was physiologically neutral.²² Factors other than body position, such as natural disease, illicit drug use, trauma, mental and physical stress, and catecholamine release, are important considerations.^{3,5,6,20,23,24} Nat-

ural disease processes, drug use, and trauma can be assessed at autopsy. By contrast, stress and catecholamine release cannot be assessed at autopsy. Even so, mental stress and disease have been associated with sudden unexpected death.^{25,26}

In these 2 cases, the trauma was minor and the drug levels were not markedly elevated. Further, the circumstances of both cases suggest that mental and physical stress were factors. In addition, the prone position is a common denominator in both cases. Despite studies demonstrating no significant physiologic effects of the prone restrained position,²⁷ no studies have taken into account the significance of another person placing compressive force either through pinning the extremities to the ground or directly placing weight on the back.²⁸ The findings of 2 prone restrained individuals with phencyclidine in their blood suggests some significance, but the position alone cannot explain sudden death.^{20,21,27} Force applied by the arresting officer on the back of the individuals for a period of time, though, would compromise respiration by restricting chest movement and be a factor to consider.²⁹

Toxicologic findings often provide significant information about why an individual behaved in an uncharacteristic manner at a particular time. Cocaine was by far the most common drug that was noted in the review, while phencyclidine was relatively uncommon. In both cases, phencyclidine was recovered in the blood, and in Case 2, the individual had recently used cocaine. Nevertheless, even with significant toxicology results, a central issue in such cases remains explaining in what way restraint contributed to death, and if so, what was the mechanism that caused death. The low incidence of deaths related to phencyclidine may be due to the low lethality of the drug.³⁰ Interestingly, only 7 deaths in the 10-year study period were attributed to phencyclidine intoxication. Both cases have findings consistent with asphyxia though only in Case 1 was asphyxia concluded to be the mechanism of death. Case 2 does overlap with previous reported cases in that cocaine use was involved in the individual's sudden death.

The findings of asphyxia are nonspecific, and the findings of petechial hemorrhages must be placed in the context of the circumstances of the case.^{31,32} In Case 1, according to the anatomic findings of multiple petechial hemorrhages, visceral congestion, and the circumstances, the conclusion about the mechanism of death was asphyxia. In Case 2, there were similar findings but different conclusions were made. The individual's being restrained was considered an important factor in determining the cause of death, but the role that the restraint played in the individual's death was medically unclear, and the manner of death was concluded to be undetermined. Phencyclidine does have an effect on release of neurotransmitters and has been associated with hypertensive crises and sudden death.³³⁻³⁵ In addition, both individuals had mild cardiac hypertrophy, which could account for a

cardiac arrhythmia in conjunction with the mental and physical stress of restraint.

Broad conclusions based on this small sample of cases cannot be made, but the review does reinforce the recurring factors that play a role in sudden death during arrest. A central issue in restraint deaths for legal proceedings is the role that position plays.^{36,37} Recently, a court in Maryland granted a motion to strike testimony by an expert witness who opined that prone positioning was a cause of positional asphyxia; in granting the motion, the court determined that prone positioning as a cause of positional asphyxia was not generally accepted by the scientific community (oral communication, from the Office of Law for Prince George's County, MD, August 2002). One court recognized that studies that demonstrated the prone position as physiologically neutral had their own limitations, and such laboratory testing is not necessarily applicable to individual cases.³⁷ Recognition of the limitations of laboratory experiments as applied to cases of sudden unexpected death is important in seeking appropriate conclusions because such cases have multiple factors that play a part in causing sudden death. The debate will continue in courts throughout the United States as to what extent a particular factor played in an individual case. However, excluding 1 factor, such as position, should not be done until one takes into account the anatomic findings of autopsy coupled with a complete death investigation.

CONCLUSION

The sudden and unexpected death of individuals during arrest are complex cases, with each case demonstrating unique circumstances that need to be taken into account. Multiple factors are involved, and toxicologic findings are critical in drawing conclusions. Most police-restraint cases examined have involved cocaine intoxication, and because phencyclidine's pharmacologic properties are quite different from those of cocaine, these cases allow for comparisons to be made about what factors may have been more important.

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