Top Emerg Med
Vol. 27, No. 1, pp. 36–43

Sudden In-Custody Death Syndrome

Debra Robison, RN, SANE-A, CEN; Shelby Hunt, MHA, RN, CEN

This article discusses the existence of excited delirium in combination with other factors such as alcohol/drug use, physical condition of subject/patient, and the use of physical or mechanical restraints that could lead to a potentially fatal condition known as sudden in-custody death syndrome. The article reviews predisposing factors in combination with potentially hazardous actions by law enforcement and healthcare providers that have led to sudden in-custody death syndrome. It is up to those coming in contact with these subjects/patients who exhibit excited delirium states to be aware of the behaviors and further assess for other precipitating risk factors that may require further medical attention. **Key words:** *adverse effects*, *alcohol*, *asphyxia*, *cocaine*, *death*, *delirium*, *physical restraints*

RESTRAINT ASPHYXIA or positional asphyxia (asphyxiation death while in a prone position and hog-tied restraints in whole or in part from respiratory compromise)[1] (Fig 1) are terms generally used to describe a diagnosis after death when there are many contributing factors but the primary cause of death seems to be related to the restraint process. The concept of asphyxia due to restraint arose when it was recognized that being in the prone position could severely restrict breathing and compromise cardiac function in an agitated person.[2] Interference in the body's ability to breath (interaction of the chest wall, diaphragm, and muscles of the rib cage and the abdomen) causes a hypoxic state. This changes the body chemistry and can create a fatal heart rhythm.[1] In the mid-1990s, unexpected deaths while in custody restraint where the autopsy and toxicology failed to lead to a definitive diagnosis were often labeled with "sudden in-custody death syndrome" (SICDS).[3]

Sudden in-custody death syndrome was first used to describe unexplained deaths when police were involved. It was first observed in 1982, when investigators in Seattle, Wash, described the sudden death of people in states of acute psychiatric agitation and hyperactivity when being restrained by law enforcement officers.[4] These individuals exhibited a form of behavior disturbance that went beyond the distressed states that police generally encounter.[5] The victims are generally described as being unusually aggressive. They do not respond appropriately to reasoning or commands and exhibit unusual strength. They inspire fear in those who know them; however, they are fearful themselves past the point of paranoia. They may be hallucinating and have a history of bizarre behavior, but the episode prior to death is far beyond their previous experiences (Table 1).

The police were notified because the subject was acting in a destructive manner, either to himself or his environment. The arrival of the police may worsen agitation. The paranoia of the manic person will be reinforced by the attempt of the law enforcement to make the person conform. This prompts further and more destructive behavior.

From the Emergency Department, Saint Mary's Regional Medical Center, Reno, Nev.

Special thanks to Diane Nicholson, Undersheriff, Washoe County Sheriffs Department, Donna Alexander, MLS, Medial Librarian, Saint Mary's Regional Medical Center, Tim Mayes, Reno Police Department, Mary Harcinske, MBA, RN, and Matt Robison, restrained subject.

Corresponding authors: Debra Robison, RN, SANE-A, CEN, and Shelby Hunt, MHA, RN, CEN, Emergency Department, Saint Mary's Regional Medical Center, 235 W Sixth St, Reno, NV 89503 (e-mail: debbir80@charter.net and shelby.hunt@saintmarysreno.com).

Figure 1. Subject is in a hog-tie or suitcase restraint and placed in a prone position.

The mechanism of the spiral into the unusually aggressive behavior is unknown. The behavior may be precipitated by acute psychosis. The use of cocaine, methamphetamines, or phencyclidine, alone or in combination, may also help precipitate the event leading to SICDS. Alcohol and depressant drugs, statistically, may be involved but do not create the hyperexcitability required to create the excited delirium state. Another contributing factor named is the use of antipsychotic drugs, or neuroleptics (Table 2). Although neuroleptics may contain the psychiatric behavior of the patient, there are serious side affects. These include arrhythmias, vascular collapse, and asphyxia related to factors such as an impaired gag reflex and laryngeal-pharyngeal dystonia. Also known as neuroleptic malignant syndrome, patients suffering from this syndrome present in a manner very similar to excited delirium. Physical exhaustion, dehydration, and organic brain disease are additional predisposing factors.

Table 1. Behaviors exhibited during the predeath situation

Paranoia/mania
History of psychiatric issues
Extreme aggression
Unusual strength
Inability to respond appropriately to reason
Destructive behavior
History of drug abuse

Table 2. Contributing factor: Neuroleptics

Generic name	Trade name
Chlorpromazine	Thorazine
Thioidazone	Mellaril
Fluphenazine	Prolixin
Thioxanthene	Navane
Haloperidol	Haldol
Respiradone	Respiradol
Clozapine	Clozaril
Olanzapine	Zyprexa
Seroquel	

Symptoms include hyperthermia, fluctuating levels of consciousness, and hypotonicity.

However, while that may be one of the causes of a sudden death, it is not necessarily implicated in the exhaustive manic, and, in fact, may be a contributing factor to saving the life of the psychotic patient who may be heading toward the excitable delirium state. A syndrome of sudden death of psychiatric patients, called acute exhaustive mania, also known as lethal catatonia, was noted prior to the introduction of antipsychotic medication. Dr Luthor Bell at the McLean Asylum in Massachusetts first described the condition in 1849.[6] The psychotic individual may also exhibit the signs of acute exhaustive mania without having used neuroleptics. It is contended that psychological stress can induce fatal cardiac arrhythmias. The psychotic individual with these symptoms is considered to be in a life-threatening emergency and the patient should be transported immediately to the emergency department. It is also noted in this article that psychiatric patients can be at risk for many health problems secondary to their living conditions. They may have preexisting cardiac disease, or general physical disability secondary to lifestyle. When the patient enters the state of excitable mania, the increased release of epinephrine and norepinephrine and the increased vagal and

Table 3. Excitable mania

Increased epinephrine release
Increased norephinephrine release
Increased vagal stimulation
Increased adrenergic stimulation
Increased myocardial excitability
Eventual cardiac failure

adrenergic stimulation may increase myocardial excitability and lead to fatal cardiac arrhythmia (Table 3).

ELECTRICAL/CHEMICAL RESTRAINTS

Capsicum spray has also been named as a possible influence in the SICDS victim, without being the sole agent of the death. In 1991, the International Association of Chiefs of Police (IACF) issued an executive brief, "Responding to the need for a less than lethal alternative, police departments throughout the country have adopted Oleoresin Capsicum (OC) or pepper spray as a force option."[7] When deaths began to occur after the use of OC spray, a task force was formed to provide data regarding the use of OC by police, and its influence in the death of persons in the excitable manic state. The IACF studied 30 cases over the period of 1990 to 1993 (Fig 2).

It was noted that in the majority of these cases, the OC was ineffective. All subjects behaved in a bizarre and combative manner and struggled with the police. The OC was listed in all cases as to be a noncontributing factor and not a cause of death. The cause of death in the majority of the cases was determined to be positional asphyxia, aggravated by drugs, disease, and/or obesity. Steffee et al determined that OC was an associated contributing factor in unexpected deaths among those exhibiting excited delirium, particularly those with heart disease.[8]

In the late 1990s, the use of taser stun guns became prevalent in law enforcement. Again touted as a safe way to restrain the combative or violent subject, it was believed that there would be a decrease in subject as well as officer injury. On October 12, 2004, *The Arizona Republic* published a list of 73 cases of death following taser stun gun use. Dating from September 1999 to October 2004, the commonalities are noted (Fig 3).

The use of restraint is mentioned only 29 times, but it would certainly make sense that it was used more number of times than the brief histories report. Obviously in all cases Taser was used. There is very little research regarding the effect of electricity in the subject in a excited delirium state. Certainly, in the situation of cardiac dysrhythmia, the use of electricity may contribute to the end lethal

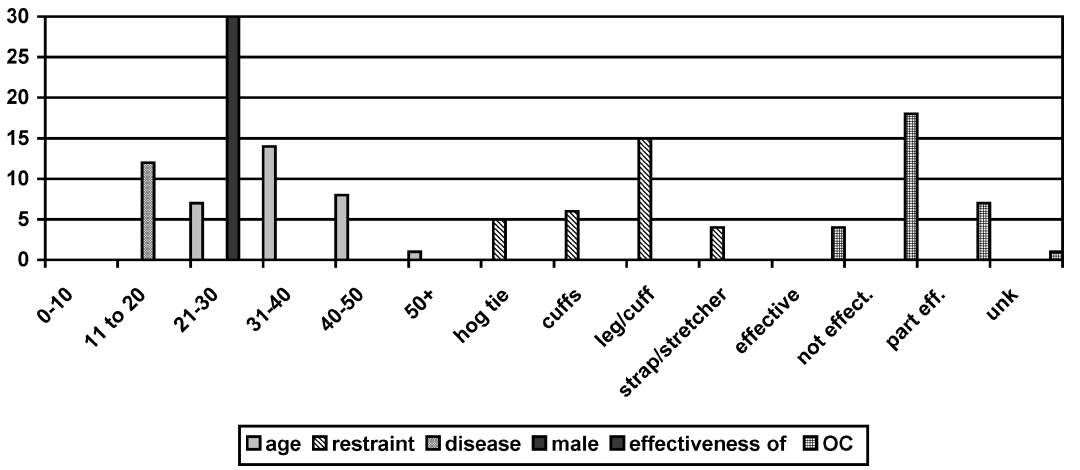

Figure 2.

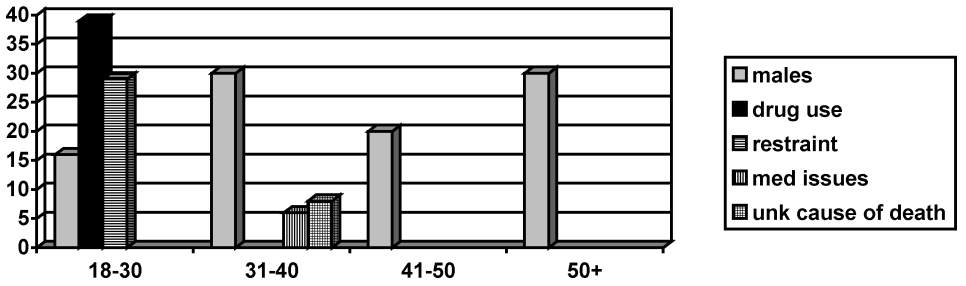

Figure 3.

result. It is of note that 11 of the 73 deaths seemed to occur immediately after Taser use.

In 1998, the *Canadian Medical Association Journal* published a study done on 21 subjects that fit the excited delirium criteria from 1988 to 1995 (Fig 4).

It was concluded from this study that people with cocaine use or psychiatric illness may require more oxygen and may suffer a rapid anoxic death if restraint is used.[9]

PHYSICAL RESTRAINT

A study done in Los Angeles County between 1992 and 1998 did not have many incidences of SICDS but of the 22 sudden death situations during that time, all were instances of the victim having been hobble restrained. One victim had a significant thrombosis and was excluded from the study. Another had ligature marks around the neck and was also excluded. The remaining 20 were found by EMS personnel in a prone position with hobble restraints on.[10] Asphyxiation, the most common cause of restraint-related death, is termed "restraint asphyxia" in the forensic and emergency literature.[11] Restraint asphyxia is determined on the basis of the historical events leading up to the episodic event of physical struggle. Generally, the body's position interferes with respiration. In the forensic literature, usually the body was in the prone position not allowing adequate breathing. The cases of fatal positional asphyxia studied were those that had occurred in individuals transported in the prone position by law enforcement personnel.[12] However, other positions, including a bent neck with flexion toward the chest, and external airway obstruction or neck compression, where the victim was not able to release himself from the compromising position, have also been noted to be contributing factors[13] (Table 4).

Upper-body holds (ie, the carotid hold and the choke or bar-arm control hold) are not commonly employed law enforcement techniques, and have been used for more than 30 years to subdue suspects resisting arrest

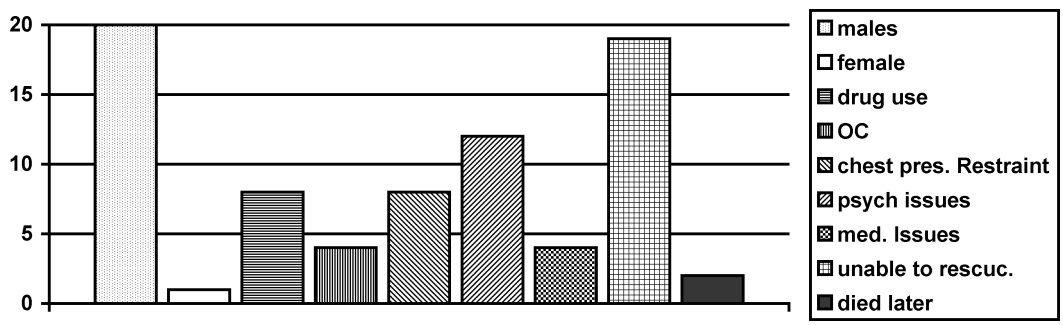

Figure 4.

Table 4. Positions contributing to death by restraint asphyxia

Prone position, hog tied
Neck flexed toward chest
External airway obstruction
Neck compression

or to control combative behavior. The holds are intended to be used to render temporary unconsciousness, but not as fatal maneuvers. Pressure applied to the carotid artery area impedes blood flow, which could produce carotid sinus stimulation and result in bradycardia and cardiac arrest.[14,15] Suffocation and aspiration may also occur in persons having an altered or decreased level of consciousness, interfering with their ability to protect their airway.

COCAINE USE

With cocaine use, the episode of excited delirium is most often seen at the end of one or more days of drug use. Cocaine levels may be low or undetectable. The effects of the cocaine on the brain's neurotransmitters lead to a loss of thermoregulatory control and alter the thought process. If the patient is not breathing rapidly, is not sweating, and is not tired after a struggle with the police, while the officers are all showing these changes, there is a high likelihood of impending collapse. Body temperature has a high correlation to a disordered central nervous system regulatory process, leading to a loss of thermal regulation and hyperthermia (Table 5).

Table 5. Signs and symptoms of impending collapse with cocaine use

Absence of tachypnea when patient should be breathing heavily secondary to increased activity
Normal body temperature
Lack of perspiration after sustained physical activity

Table 6. Physiological changes with cocaine use

Disrupts dopaminergic function
Precipitates agitation
Delirium
Aberrant thermoregulation
Rhabdomyolysis
Sudden death

Cocaine disrupts dopaminergic function and may precipitate agitation, delirium, aberrant thermoregulation, rhabdomyolysis, and sudden death (Table 6).

One of the organs that principally get targeted by cocaine toxicity is the heart. Cocaine is known to produce coronary artery spasm.[10]

In early 1994, Washoe County Sheriff's Department (Nevada) encountered a male subject who fit the criteria for excitable delirium (Fig 5). During the use of restraint and after struggle the subject died. The information was beginning to be disseminated throughout the United States regarding the SICDS and the problematic use of restraints. In response, the department created the policy that if subjects met certain criteria, they would be transported to area emergency departments and put under observation. Sheriff Diane Nicholson feels that this policy has greatly improved the quality of care given to the manic subject. They also changed the policy of prone restraint and hog-tying restraint. In spite of this, in August 2004, a male subject died in custody after a struggle with the police. According to *The Reno Gazette Journal,* August 20, 2004, the coroner's report stated the victim died of a heart attack secondary to methamphetamine use. Taser, restraint, and pepper spray were also used on this person.[16] The victim died prior to EMS arrival on the scene. The fact remains that there are circumstances and times when, despite the police department's best intentions, death occurs. Consequently, officer awareness and recognition are necessary to ensure subject safety and minimize the risk of sudden custody death. With that

Use this scale to help determine the need for closer observation. Begin at the first observed sign or symptom. Add the numbers for each sign or symptoms that applies.

Alcohol Intoxication	1
Acute Alcohol Intoxication	3
History of Alcohol Abuse	2
Cocaine Intoxication	4
Methamphetamine Intoxication	3
Drug Intoxication (other)	2
Antipsychotic Drug Use	2
History of Mental Illness	2
Bizarre Behavior	2
Shouting	2
Paranoia	3
Violence Against Others	2
Above Normal Physical Strength	2
Sudden Tranquility Lethargy	2
Moderate Physical Activity	2
Intense Physical Activity	3
Obesity	1
"Big Belly"	2
Profuse Sweating	4
Shivering	4
Ineffectiveness of OC Spray	2
Cyanosis of Lips/Nail beds	5
Confusion/Disorientation	3

Score 16 or above: Subject is at EXTREME RISK for sudden in-custody death syndrome (SICDS). Immediate medical attention is necessary.

Score 10–16: Subject is at HIGH RISK for SICDS. Immediate evaluation by EMS personnel is necessary. Medical treatment may be warranted. Subject must be monitored closely.

Score 5–10: Subject is at MODERATE RISK another officer familiar with the Risk Assessment Scale and SICDS. Subject should be monitored by police and Detention Staff.

Score 0–5: Subject is at LOW RISK for SICDS, based on known risk factors. Personnel should be watchful for any signs of distress that would preclude the assessment scale.

IMPORTANT: THE FOLLOWING CONDITIONS NECESSITATE IMMEDIATE MEDICAL ATTENTION:

- Profuse sweating and shivering
- Loss of consciousness
- Seizure
- Respiratory rate below 6 per minute
- Severe headache
- Chest pain
- Obvious respiratory distress
- Gagging, coughing, or choking lasting more than 4 minutes after OC spray

Figure 5. In-custody death: Risk assessment scale.

information, the use of hog-tying restraint and neck holds have been reintroduced as a way of restraint in Reno, Nev. The restraint process is recognized as being necessary at times. The take home message is: "Knowledge is safety." The subject is placed in a lateral position with a police officer in attendance at all times (Fig 6). The subject is considered one-on-one with the police, is a critical patient, and is cared for as a one-to-one nurse to patient ratio. The patient remains restrained and with an officer until the desired response is obtained. The police are also cognitive of the signs of impending collapse and release the subject accordingly. If the patient makes the statement "I can't breathe" or "I am going to die," he is reevaluated and released immediately.

The sudden death after an episode of excited delirium is due to a combination of physiological events. The event is precipitated by psychotic breakdown or as a result of drug use. There is an increase in oxygen demand secondary to the profound increase in activity. There is increased epinephrine and norepinephrine release into the system. The cardiac oxygen demands become intense, without an opportunity to rest and resupply. The heart rate and respiratory rate increase. With

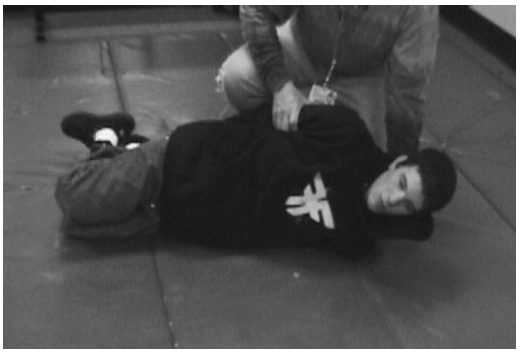

Figure 6. Subject is placed in left lateral position, with hog-tie restraints. Respiratory status is evaluated routinely.

a prone restraint, the diaphragm is inhibited and is unable to expand and allow for oxygenation. Panic and increased oxygen demand occurs and, after a relatively short amount of time, there is cardiac and respiratory collapse. Autopsy reports are nonspecific for injury.

Positional asphyxiation is determined after obtaining a history surrounding the cause of death. The cause of death for these individuals is similar to the positional asphyxia that occurs when an alcoholic becomes stuporous and falls into a position that creates respiratory compromise. This can also occur with epileptic patients who are unable to control their airways. Medical examiners argue that people who die of excited delirium death syndrome while restrained are not victims of incompetence or brutality, but rather victims of their own long-term drug use, which resulted in a strained heart that further exacerbated the victim's condition.[17]

This article focused on the definition of SICDS, its clinical manifestations, contributing factors leading to a diagnosis of SICDS, and interventions to be employed when an individual is in custody. Overall, multiple factors have been associated with sudden death when a person is restrained and is in an excited delirium state. These individuals are at a high risk for sudden death. Law enforcement officers and hospital personnel should be aware of the risks associated with restraints in subjects/patients in an excited delirium state. Careful screening and monitoring of these people and use of appropriate communication techniques need to be immediately initiated. If upper-body holds or prone position restraining are warranted and used by those specifically trained in these techniques, diligent monitoring and observation of these subjects must be done. Immediate medical attention and examination needs to take place if the person meets assessment criteria for his condition to exacerbate to a worsening and potentially deadly state. By implementing procedural protocols, the potential for SICDS may decrease.

REFERENCES

1. Reay DT. Suspect restraint and sudden death. Available at: http://www.fbi.gov/publications/leb/1996/may966.txt. Accessed August 20, 2004.
2. Reay DT, Howard JD, Fligner CL. Effect of positional restraint on saturation and heart rate following exercise. *Am J Forensic Med Pathol.* 1988;9(1):16–18.
3. O'Halloran RL. Reenactment of circumstances in deaths related to restraint. *Am J Forensic Med Pathol.* 2004:25(3):190–193.
4. Reay DT, Eisele JW. Death from law enforcement neck holds. *Am J Forensic Med Pathol.* 1982;3(3):253–258.
5. Connor M. Excited delirium, restraint asphyxia, positional asphyxia and "in-custody death" syndromes. Available at: www.educationoptions.prg/programs/articles/SuddenDeath.html. Accessed September 30, 2004.
6. *The Association Between Antipsychotic Drugs and Sudden Death.* Report of the Working Group of the Royal College of Psychiatrists Psychopharmacology Sub Group Council. London: Royal College of Psychiatrists; January 1997. Report CR 57.
7. Granfield J, Onnen J, Petty C. *Pepper Spray and In-custody Deaths* (Executive brief). Alexandria, Va: International Association of Chiefs of Police; March 1999.
8. Steffee CH, Lantz PE, Flannagan LM, Thompson RL, Jason DR. Oleoresin capsicum (pepper) spray and in-custody deaths. *Am J Forensic Med Pathol.* 1995;16(3):185–192.
9. O'Halloran R, Lewman L. Restraint asphyxiation in

excited delirium. *Am J Forensic Med Pathol.* 1993; 14(4):289–295.
10. Stephens B, Jentzen J, Karch S, Mash D, Wetli C. Criteria for the interpretation of cocaine levels in human biological samples and their relation to the cause of death. *Am J Forensic Med Pathol.* 2004;25: 1–10.
11. Reay DT. Death in custody. *Clin Lab Med.* 1998;12:1–22.
12. Bell MD, Rao VJ, Wetli CV, Rodriguez RN. Positional asphyxia in adults: a series of 30 cases from the Dade and Broward County Florida Medical Examiner offices from 1982–1990. *Am J Forensic Med Pathol.* 1992;13:101–107.
13. Howard JD, Reay DT. Positional asphyxia. *Ann Emerg Med.* 1997;32:116–118.
14. Reay DT, Holloway GA. Changes in carotid blood flow produced by neck compression. *Am J Forensic Med Pathol.* 1982;3:199–202.
15. Mercy JA, Heath CW, Rosenberg ML. Brief research report: mortality associated with the use of upper-body control holds by police. *Violence Vict.* 1990;5(3):215–222.
16. O'Malley J. Drugs caused fatal heart attack during struggle with officers. *Reno Gaz J.* August 20, 2004:3C.
17. Paquette M. Excited delirium: does it exist? *Perspect Psychiatr Care.* 2003;39(3):93–94.