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REPORT OF INVESTIGATION

DATE: June 4, 2011

CASE: Riverside Police Department File # P08157587

SUBJECT: Officer Involved Death of Marlon Oliver Acevedo, which occurred on October 31, 2008 @ 2145

On June 1, 2011, I received a written request from Frank Hauptmann, Manager of the Community Police Review Commission, to review the circumstances surrounding the officer involved death investigation of Marlon Acevedo. I was then asked to provide my expert opinion in a written report on the manner in which the case was investigated by the Riverside Police Department.

I reviewed over 500 pages of police reports, photographs and other documents contained in the presentation by the Riverside Police Department to the Community Police Review Commission. I also drove to the scene of the incident, to better understand the police reports.

CASE SYNOPSIS

On October 31, 2008, Halloween, at approximately 2145, Riverside Police Department received several 911 calls regarding a man standing in the street, blocking traffic in the 7800 block of Cypress Ave.

Riverside Police Officers, Dan Koehler, a 20 year law enforcement veteran, and Jeff Ratkovich, a Riverside Policeman for just 2 years, responded to the radio call. Just a few hours earlier, at the same location, the officers were flagged down by an adult male, standing on the side of the road. The officers stopped and asked the male if he required assistance and were told that he was keeping the streets safe and asked that



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the officers do the same. Upon hearing the radio call, Officers Koehler and Ratkovich wondered if the subject of the call was the same male.

Officers Koehler and Ratkovich were the first officers on scene and immediately recognized the subject in the street, Marlon Acevedo, as the same man they had made contact with earlier.

The officers exited their marked police car and Officer Koehler asked Mr. Acevedo to get out of the street as he was holding up traffic. Mr. Acevedo began to grunt and growl and advanced on Officer Koehler. Mr. Acevedo had his fists up, in a fighting position, as he approached the officer, ignoring orders to lay on the ground. Mr. Acevedo swung his fist at Officer Koehler's face, missing him. Both officers deployed their batons, striking Mr. Acevedo in both legs. Mr. Acevedo struck Officer Koehler in the face, knocking off his glasses. All three men fell to the ground and Mr. Acevedo attempted to bite Officer Koehler in the groin. Officer Ratkovich stood and fired his taser into Mr. Acevedo's stomach in an attempt to overcome his aggression. In a period of 59 seconds, Mr. Acevedo received 6 cycles from the taser. He was subdued when, after the fifth cycle, Officer Ratkovich removed the taser cartridge and produced a "drive stun" shot directly into Mr. Acevedo.

As assisting units began to arrive, Officer James Heiting was asked to get his hobble restraint from the trunk of his police car and help place Mr. Acevedo in a TARP position, with his legs tied together and connected to his hands.

Within seconds, Riverside Fire Department and an ambulance arrived on scene. Paramedics discovered that Mr. Acevedo was in medical distress and all restraints were removed from Mr. Acevedo while he was being treated. He was transported to a local hospital where he was pronounced dead approximately one half hour later.

A post mortem examination of Mr. Acevedo revealed no obvious cause of death. However, after a toxicological examination, the cause of death was attributed to PCP



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intoxication. Cannabinoids and atropine were also found in his system. He was also suffering from hypertrophic cardiomyopathy, heart disease.

EXPERT QUALIFICATIONS

I was employed as a peace officer for the Los Angeles Sheriff's Department for 34 years. I worked as a jail deputy, 18 months as a patrol officer, and four years assigned to the Special Enforcement Bureau (SWAT team). My last 27 years on the department, I was assigned to the Detective Division, including over 22 years assigned to the Homicide Bureau. I investigated over 450 homicides and suspicious deaths and over 100 Officer Involved Shootings, including the murders of ten police officers.

In 1994, I assisted in writing the LASD Homicide Bureau Investigative Manual. I was also selected to be a member of the Joint LASD/LAPD Crime Lab Development Committee as well as the JET Committee to develop Homicide Bureau job standards and selection criteria. In 1995, I was selected as California's Deputy Sheriff of the Year by the California Organization of Police and Sheriffs (COPS) for the investigation, arrest, and conviction of a suspect in the murders of two local policemen.

For over 15 years, I have taught "High Profile Murder Investigations", "Homicide Scene Management", and "Officer Involved Shooting Investigations" for the Robert Presley Institute of Criminal Investigation, police academies, advanced training classes, supervisor training, college classes, Homicide School, and in-service training. I am currently on staff with the Police Policy Studies Council where I teach and consult nationally on officer involved shooting, homicide, and suspicious death investigations. I am currently the investigator for the Riverside Police Review Commission. Although I retired from LASD in 2002, I was immediately signed to a contract to train newly assigned homicide detectives. In 2006, I was also assigned to the LASD Cold Case team where I have reviewed over one thousand unsolved murders and specifically work the unsolved DNA and latent print cases.



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INVESTIGATION AND REVIEW

The investigation into the officer involved death of Mr. Acevedo was conducted by the Riverside Police Department and the Riverside County District Attorney's Office.

I reviewed all the reports submitted to the Community Police Review Commission. I also extensively researched excited delirium and discussed this phenomenon with both Medical, Legal and Law Enforcement Experts.

CONCLUSION

At the time of this incident, several citizens called 911 to report someone standing in the street. Sidney Zamora reported there was "a crazy guy in the street" and the person was "looking to fight". Justin Resori said "he's either real drunk or frickin crazy".

Even the 911 Operator is heard to ask "Is that him screaming in the back?". Officer Koehler stated that when he initially approached Mr. Acevedo, the subject took a combative stance and Officer Koehler held up his arms in an attempt to diffuse the situation.

Officer Koehler told the Detectives "I'm a big guy...I had no control over him". Officer Ratkovich stated that Mr. Acevedo looked "angry and upset" and had a "crazed look on his face".

Detectives discovered that on May 3, 2008, Riverside police officers were called to the same location when Mr. Acevedo was discovered on the bathroom floor, yelling and throwing things. He appeared confused and excited and was grunting, sweaty, and could not stand. He was transported to the hospital where he had admitted smoking PCP and said "PCP is hard to get a hold of because nobody has it anymore". A blood test revealed the presence of PCP and cannabinoids, the same drugs found in Mr.



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Acevedo's system at the time of his death. This suggests that he smoked marijuana, laced with PCP.

In researching Excited Delirium, I discovered that individuals with this condition are confused, irrational, hyperactive, and usually violent. After a violent struggle, they become unresponsive, develop cardiopulmonary arrest, and do not respond to CPR.

The National Institute of Justice (NIJ) just completed a study of nearly 300 deaths, nationwide, after suspects were shot by tasers. NIJ found that most of the deaths were caused by underlying health problems. (Note: Mr. Acevedo had heart disease.)

The study concludes that it is appropriate for officers to use stun guns and that the risk of death is less than 0.25%.

I have attached several handouts, i.e., Medical Panel Issues Interim Findings on Stun Gun Safety; Tactical Emergency Medicine; Excited Delirium; What is Excited Delirium; 10 Training tips for Handling Excited Delirium; Does Excited Delirium Kill Taser Victims?; Excited Delirium (from Dimaio's Forensic Pathology) Neurochemistry of Excited Delirium (from Karch's Pathology of Drug Abuse); and more.

The Seattle, Washington Police Department reports 70 cases of excited delirium in the last 2 years. Due to the large number of these types of cases, patrol officers and paramedics train together. Closer to home, in the last several months, Los Angeles Sheriff's Department, Homicide Bureau, has investigated 4 Excited Delirium officer involved deaths.

Riverside Police Department Detectives were assigned a controversial, complex case. After completing my review of the indicated material, it is my expert opinion that this officer involved death investigation met or exceeded the POST Standards of Practice. It was also conducted in a fair and impartial manner and I saw no evidence to suggest Riverside Police Department gave nothing but their best effort.

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Medical Panel Issues Interim Findings on Stun Gun Safety

by John Morgan, Ph.D.

During the three-year period from 2003 to 2005, 47 states and the District of Columbia reported 2,002 arrest-related deaths to the Bureau of Justice Statistics' Deaths in Custody Reporting Program.¹ For many years, police leaders have sought alternatives to lethal force and better methods to subdue individuals to limit injuries and death.

Less-lethal devices have been used by law enforcement for decades; during the early 1990s, pepper spray became the less-lethal option of choice for law enforcement and corrections agencies. Although pepper spray is inherently safer than lethal-force options and may be preferable to blunt-force methods, many advocates were concerned that pepper spray was associated with in-custody deaths. The National Institute of Justice (NIJ) reviewed those cases and, in 2003, issued a report that found pepper spray was safe and effective.²

In recent years, electro-muscular-disruption technology — also known as conducted-energy devices (CEDs) or stun guns or by

the trade name-Taser® — has become the less-lethal device of choice for a growing number of law enforcement agencies. CEDs use a high-voltage, low-power charge of electricity to induce involuntary muscle contractions that cause temporary incapacitation. Industry reports suggest that approximately 11,500 law enforcement agencies around the country have acquired CEDs, with approximately 260,000 devices now deployed. In 2003, TASER International introduced the Taser X26®, the conducted-energy device most widely used by law enforcement today.

Although studies by law enforcement agencies have found that the deployment of CEDs reduced injuries to officers and suspects,³ a significant number of individuals have died after CED exposure. Some were normal healthy adults; others were chemically dependent or had heart disease or mental illness. These deaths have given rise to questions from law enforcement and the public regarding the safety of CEDs.

Because many gaps remain in the body of knowledge with respect to the effects of CEDs, NIJ sponsored an independent research program to address the safety and effectiveness of CEDs and a study to address whether CEDs can contribute to or cause mortality and, if so, in what ways. An interim report on this study was recently released. *Deaths Following Electro Muscular Disruption* is available at <http://www.ncjrs.gov/pdffiles1/nij/222981.pdf>; a final report is expected in 2009.

The study is being conducted by an expert medical panel assembled by NIJ. The panel reviewed the full range of current scientific research, reviewed a number of CED-associated deaths and held substantive discussions with industry, academia and community advocates. At this time, many questions about the safety of CEDs cannot be answered based on current research, especially with respect to at-risk individuals. Nonetheless, although exposure to CEDs is not risk free, NIJ's medical panel found no conclusive medical evidence in current research that indicates a high risk of serious injury or death from the direct effects of CED exposure.

NIJ's Research Program

Prior to NIJ's involvement, most of the relevant research in this field had been industry sponsored. Although much of this prior work had been published in peer-reviewed journals, some questions had been raised about the influence of industry funding on the results. For its CED safety studies, NIJ funded researchers, physicians and other professionals who have never been employed by companies in the field, including TASER International, Inc.⁴ Device manufacturers did cooperate with and provide important information to NIJ-sponsored researchers and studies.

NIJ's research program has included three main types of study. In general, physiological research provided a controlled way to examine the limits of CED exposure and how such exposure might affect at-risk populations, such as individuals with high body temperature or who were compromised

Although exposure to CEDs is not risk free, NIJ's medical panel found no conclusive medical evidence in current research that indicates a high risk of serious injury or death from the direct effects of CED exposure.

by drug exposure.⁵ Human subject testing was performed with police volunteers during training to determine the effects of CED exposure on healthy individuals, especially with respect to changes in heart function and blood chemistry. Field data collection provides information about how CEDs are used and how they affect a range of individuals in real-world settings. Some field data were retrospective, based on reconstruction of information in police reports. Other field data were collected by medical personnel soon after the use of CEDs by law enforcement.⁶

These studies have improved the understanding of the safety and effectiveness of CEDs. Researchers at the University of Wisconsin found that CEDs can directly "electrocute" the heart rhythm, although the chance of this happening is quite small.⁷ Theoretically, this can happen only in individuals with very little distance from their skin surface to their pericardium, the sack around the heart muscle. Research published in 2007 shows that CEDs can cause heart fibrillation (a dangerously disturbed heart rhythm) in people with pacemakers, presumably because the CED shock can travel down the electrical leads of the pacemaker device.⁸

One concern with CEDs has been that they cause involuntary muscle contractions and thus might cause muscle breakdown, changes in blood chemistry, and perhaps resulting heart failure. Physiological testing has not shown significant signs that these problems actually occur.⁹ CED exposure can cause a small, temporary increase in lactate, similar to what might be seen during moderate exercise. This result confirms industry studies.

The panel said that law enforcement need not refrain from deploying CEDs, provided the devices are used in accordance with accepted national guidelines.

Cases of Excited Delirium

Supporters of the use of CEDs attribute many in-custody deaths to a syndrome called excited delirium. Excited delirium is not a medical diagnosis, but a term describing people who may have psychosis or drug intoxication. These individuals may show great strength, agitation and violent behavior. Their body temperature will often be very elevated, to potentially lethal levels.

Law enforcement officers encounter suspects in excited delirium frequently and must use force to subdue them. People in excited delirium are at high risk of death even if they do not encounter a police officer and even if a CED or other weapon is not used against them. These individuals must be calmed and their body temperature reduced as soon as possible to avoid sudden death.

Although preliminary data from physiological studies suggest that CEDs may increase the risk of sudden death in cases of excited delirium, NIJ's study panel concluded in its interim report that CEDs do not directly cause death in excited delirium cases. The panel noted that this does not mean that CEDs are entirely ruled out from having a role in such deaths. Everything that happens to a person that causes excited delirium and stresses a person in excited delirium may be a contributing factor in his or her

death, whether he or she ingested drugs or engaged in a physical struggle.

Many police departments are working with emergency medical responders to deal with excited delirium cases more effectively. In Dade County, Fla., responders have implemented protocols based on Canadian research to reduce the risk of death in these individuals. Interventions include sedation with the drug Versed and reduction in body temperature using chilled intravenous fluids. Although not recommending Dade County's protocol specifically, NIJ's interim report on in-custody deaths does support active intervention in excited delirium cases, which may include cooling, sedation and hydration.

The Panel's Recommendations

As stated earlier, the NIJ medical panel noted that, at this time, many questions about the safety of CEDs cannot be answered based on current research, especially with respect to at-risk individuals. The panel found, however, that there is no conclusive medical evidence to indicate a high risk of serious injury or death from the direct effects of CED exposure. In fact, field experiences in many police departments indicate that exposure is safe in the vast majority of cases.¹⁰ Therefore, the panel said, law enforcement need not refrain from deploying CEDs, provided the devices are used in accordance with accepted national guidelines. (See *Electronic Control Weapons*, a model policy of the International Association of Chiefs of Police.¹¹)

The panel's interim report includes significant recommendations for post-event medical care and investigation of in-custody deaths. It is not possible, the panel said, to reach a definitive conclusion concerning the role of less-lethal devices in a death unless the relevant facts have been established about the incident and the decedent. The report also includes a bibliography of scientific papers that have been systematically reviewed for their relevance and quality. This bibliography represents an authoritative foundation for the inclusion or exclusion

About the Author

John Morgan is the Deputy Director for Science and Technology at the National Institute of Justice. He co-chaired the Steering Group of NIJ's study, *Deaths Following Electro Muscular Disruption*.

of CEDs in deaths. Although it does not include every possible source of information, the bibliography does represent a reliable set of information accepted by the NIJ medical panel.

NIJ's review of CED technology provides the needed basis for the appropriate use of these devices. The legitimacy of law enforcement is, in part, derived from the care taken in choosing technology to subdue or suppress individuals. NIJ plays an integral role in this process by developing knowledge about a wide range of technology and practice — including this recent interim report on conducted-energy devices — based on rigorous scientific research.

NCJ 224086

For More Information

- Information on less-lethal technologies and NIJ's work in this area is available at <http://www.ojp.usdoj.gov/nij/topics/technology/less-lethal/welcome.htm>.

Notes

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2. *The Effectiveness and Safety of Pepper Spray*, Research for Practice, Washington, DC: U.S. Department of Justice, National Institute of Justice, April 2003 (NCJ 195739), available at <http://www.less-lethal.org/docs/59/NIJ-Effectiveness-of-Pepper-Spray.pdf>.
3. See, for example, <http://www.seattle.gov/police/publications/forg/community.htm>.
4. Dr. Cynthia Bir, who presented information to NIJ's medical panel, tested and evaluated Stinger CEDs with funding received from Stinger in 2006. Bir is currently researching the development of new models to replicate excited delirium.
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Tactical Emergency Medicine Section

Excited Delirium and Sudden Unexpected Death

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During a three-day period in June 2004, 3 individuals died after being restrained by police in Florida, Minnesota, and California. All had exhibited bizarre behavior necessitating police intervention. All arrests involved struggle and subsequent restraint, including one situation where the individual was struggling with neighbors prior to police and EMS arrival. All arrests eventually required the deployment of OC spray, a TASER device, or both. In the California case, the suspect was evaluated and cleared by EMS prior to being transported to jail. Within two miles from the scene, the patient began to complain of difficulty breathing and subsequently died. In the Minnesota case, the suspect became unresponsive shortly after being cuffed, and was pronounced dead at a local emergency department. In the Florida case the patient was taken to an emergency department where he died. All final autopsy reports are pending at this time.

These cases show a striking similarity to a recent Cincinnati, Ohio case, which received international attention. During a videotaped arrest, an agitated male suspect attacked the responding officers. The two officers subsequently attempted to subdue the suspect, striking him repeatedly with their batons. Although knocked to the ground, he continued to struggle, requiring a total of 6 officers to place him in handcuffs. At this point, outside the view of the police camera, the suspect ceased struggling. An officer can be heard on the videotape stating

"He's still got a pulse. I don't see him breathing." The suspect was pronounced dead soon after arrival at the emergency department. The Hamilton County coroner noted that the suspect had an "enlarged heart", and that both PCP and cocaine were detected on toxicological tests. No evidence of internal injury was noted.

The term excited delirium (ED) was first used in 1849 to describe psychiatric patients who developed onset of continuous agitation and mania, in the presence of fever, and then suddenly collapsed and died. Fatal ED was first described in 7 cocaine users between April 1983 and May 1984 ^[1]. Since that time, more than 130 cases of fatal, cocaine-associated ED have been reported in the medical and forensic literature ^[1-5].

Fatal ED appears clinically to consist of 4 distinct phases, which occur sequentially: elevated temperature, agitated delirium, respiratory arrest, and death ^[6]. Patients initially appear agitated to grossly psychotic, and exhibit feats of superhuman strength, especially during attempts to restrain them. Shortly after being restrained, the violent struggling appears to cease, and a labored or shallow breathing pattern is noted ^[2-4]. The patients are typically found dead or near dead moments later. Death typically occurs within 1 hour of first contact with police ^[2]. More than 75% of patients died either at the scene or during initial transportation ^[2]. In one study, initial cardiac rhythms were described in 13 cases ^[3]. In contrast with acute cocaine toxicity, ventricular dysrhythmias occurred in only 1 patient. Asystole was the most common presenting rhythm.

The actual cause of cocaine-associated ED and sudden death is unknown. Studies have suggested that the elevated temperatures seen in these patients is due to abnormal changes in brain dopamine receptors ^[7]. The vast majority of these patients died after a struggle. Such struggles increase the levels of circulating epinephrine ^[5,6], and may also result in a metabolic acidosis.

While unexpected death is by definition unexpected, the stunning similarities observed in all these fatal ED cases provide law enforcement and EMS personnel with potential warning signs. All individuals who demonstrate evidence of ED should be taken to a medical facility for evaluation, rather than to a law enforcement facility. Individuals should be placed in a non-prone position as soon as possible, and continuous oximetry instituted to document the absence of asphyxia.

The cessation of struggling by an agitated ED patient should be regarded as an ominous, near-terminal event, as should the development of shallow or labored breathing. The initial decompensation appears to be respiratory arrest, rather than cardiac arrest. Aggressive airway management and advanced cardiac life support protocols might be life-saving in these circumstances, although there is insufficient data to make any firm conclusions. Aggressive temperature control measures, analogous to those used in caring for heat-stroke patients, should be instituted.

In conclusion, excitatory delirium has been attributed to approximately 10% of all cocaine deaths¹⁶. While the death is often referred to as "unexpected" by responding personnel, there is a well-characterized progression of symptoms leading to death. It is hoped that increased awareness of warning signs might prevent future deaths.

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Related Links

Tactical Emergency Medicine Section

Excited delirium

From Wikipedia, the free encyclopedia

Excited delirium is a condition that manifests as a combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent and bizarre behavior, insensitivity to pain, elevated body temperature, and superhuman strength.^{[1][2]} Excited delirium is sometimes called **excited delirium syndrome** if it results in sudden death (usually via cardiac or respiratory arrest), an outcome that is sometimes associated with the use of physical control measures, including police restraint and tasers.^{[1][2]} Excited delirium arises most commonly in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine.^[1] ^[3] Alcohol withdrawal or head trauma may also contribute to the condition.^[4]

The diagnosis of excited delirium has been controversial.^{[5][6]} Excited delirium has been listed as a cause of death by some medical examiners for several years,^{[7][8]} mainly as a diagnosis of exclusion established on autopsy.^[1] Additionally, academic discussion of excited delirium has been largely confined to forensic science literature, providing limited documentation about patients that survive the condition.^[1] These circumstances have led some civil liberties groups to question the cause of death diagnosis, claiming that excited delirium has been used to "excuse and exonerate" law enforcement authorities following the death of detained subjects, a possible "conspiracy or cover-up for brutality" when restraining agitated individuals.^{[1][5][6]} Also contributing to the controversy is the role of taser use in excited delirium deaths.^{[3][9]} The American College of Emergency Physicians has officially recognized excited delirium as a unique syndrome^[10] and "rejects the theory" that excited delirium is an "invented syndrome" used to excuse or cover-up the use of excessive force by law enforcement.^[11]

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Pathophysiology and symptoms

"Excited delirium" was first explicitly described in 1985 as a condition relating to acute cocaine intoxication.^{[12][4]}

The pathophysiology of excited delirium has been unclear,^[10] but likely involves multiple factors.^[13] These may include positional asphyxia, hyperthermia, drug toxicity, and/or catecholamine-induced fatal cardiac arrhythmias.^[13]

A substantial majority of fatal case reports involved men, most commonly African American.^{[10][2]} Excited delirium patients commonly have acute drug intoxication, generally psychostimulants such as cocaine, PCP and methamphetamine.^[2]

The signs and symptoms for excited delirium may include:^{[2][10][14][4][15]}

- Paranoia
- Disorientation
- Hyper-aggression
- Tachycardia
- Hallucination
- Incoherent speech or shouting
- Incredible strength or endurance (typically noticed during attempts to restrain victim)
- Hyperthermia (overheating)/profuse sweating (even in cold weather)

Other medical conditions that can resemble excited delirium are panic attack, hyperthermia, diabetes, head injury, delirium tremens, and hyperthyroidism.^[16]

A 2010 systematic review published in the *Journal of Forensic and Legal Medicine* argued that the symptoms associated with excited delirium likely posed a far greater medical risk than the use of tasers, and that it seems unlikely that taser use significantly exacerbates the symptoms of excited delirium.^[17]

Society and culture

Some civil-rights groups argue that excited delirium diagnoses are being used to absolve law enforcement of guilt in cases where alleged excessive force may have contributed to patient deaths.^[18]^{[19][20]} In 2003, the NAACP argued that excited delirium is used to explain the deaths of minorities more often than whites.^[20]

Eric Balaban of the American Civil Liberties Union argued in 2007 that excited delirium was not recognized by the American Medical Association or the American Psychological Association and that the diagnosis served "as a means of white-washing what may be excessive use of force and inappropriate use of control techniques by officers during an arrest."^[5] Melissa Smith of the American Medical Association stated in 2007 that the organization had "no official policy" on the condition.^[6] Excited delirium is not found in the current version of the *Diagnostic and Statistical Manual of Mental Disorders*, however the term "excited delirium" has been accepted by the National Association of Medical Examiners and the American College of Emergency Physicians, who argued in a 2009 white paper that "excited delirium" may be described by several codes within the ICD-9.^[1]

In Canada, the 2007 case of Robert Dziekanski received national attention and placed the a spotlight on the use of tasers in police actions and the diagnosis of excited delirium. Police psychologist Mike Webster testified at a British Columbia inquiry into taser deaths that police have been "brainwashed" by Taser International to justify "ridiculously inappropriate" use of the electronic weapon. He called "excited delirium" a "dubious disorder" used by Taser International in its training of police.^[21] In a 2008 report entitled *An Independent Review of the Adoption and Use of Conducted Energy Weapons by the Royal Canadian Mounted Police*, the authors argued that excited delirium should not be included in the operational manual for the Royal Canadian Mounted Police without formal approval after consultation with a mental-health-policy advisory body.^[22]

See also

- Electroshock weapon controversy
- Positional asphyxia
- Sluggishly progressing schizophrenia
- Delirium tremens

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External links

- [1] Video of an 'excited delirium' incident- police contact, suspect/patient restraint, CPR, and paramedic arrival at incident
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- Taser firms picked up coroner's lecture tab *The Globe & Mail* (2007).
- Symposium aims to define 'excited delirium' *The Globe & Mail* (2007).
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- Taser manufacturer's view
- Excited Delirium Medical research review at the Canadian Police Research Centre
- Excited Delirium": A Two-Fold Problem S. Marshall Isaacs, M.D., San Francisco Department of Health, Paramedic Division, San Francisco, California
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Excited Delirium

Katherine G. England

Abstract

This paper will discuss several factions with excited delirium. I will discuss what the term excited delirium means, and where it came from. This paper will cover the many different ways excited delirium may be brought on, what happens to the body when it is experiencing excited delirium. Possible ways to decrease the occurrence of excited delirium, and will look into any nexus or correlation between the uses of "tools" in gaining compliance from the subjects, specifically a Taser.

Intro/Literature Review

Excited Delirium, what is this term? What does it mean? Where did it come from? There has been much controversy into what has caused and contributed to unexplained in-custody deaths in the past several years. Within the last few years there have been two primary resources/tools used by law enforcement to gain control and or compliance of suspects. Those two tools are pepper spray and the conducted energy weapon, more commonly known as Taser. In-custody deaths are generally given a cause of death but until recently these causes have been general. For example cocaine psychosis, cardiac, or many other terms that would sound familiar to the trained or untrained person. More recently there has been a new term for many unexplained deaths this term is "Excited Delirium." What is it, how is it brought on, what can be done to decrease its occurrence and is there any nexus to these types of in custody deaths and electro muscular disruption; more commonly known as Taser?

The term excited delirium is a recent name given to a cause of death that may encompass several criteria. You do not need all of the following factors to be a victim of excited delirium, but when one or more of them combine your likeliness to suffer from it are greater. Some things found to be signs of or symptoms of excited delirium are: "...bizarre or aggressive behavior, dilated pupils, high body temperature, incoherent speech, inconsistent breathing patterns, fear, panic, severe sweating, shivering and nakedness." (MDFR, 2007) These are just a few actions by persons that have been documented. According to this same protocol written by Miami Dade Fire Rescue there are also several possible causes of excited delirium. These causes are not limited to but include the following: "Overdose of stimulant or hallucinogenic drug, drug withdrawal, psychiatric patient off medication, illness, low blood sugar, psychosis, and head trauma" (MDFR, 2007). Excited delirium is believed to be a real and diagnosable disorder, and was first seen in the 1980s. In an article by Farnham he defines excited delirium as a "...state of mental and physiological arousal, agitation, hyperpyrexia with epiphora, and hostility" (Farnham & Kennedy, 1997).

While it is still unclear what exactly causes excited delirium there was much talk about this being around but called many different things and only since drug use has come into the picture has it finally started to receive the title or diagnosis of excited delirium. Many of the articles and databases used within this investigative report have stated that most of these types of deaths have occurred while the person is in police custody, or other places where there may be instances where physical confrontation may or may have already occurred. Excited delirium has contributing factors. When a person has a history of heart disease, drug use, and possibly even mental illness and they then get into a physically responsive state this begins the onset of events that lead up to excited delirium. When the person is struggling the body releases chemicals called catecholamines. When this is done and released into the body's circulation the body then reacts by pumping the heart faster, and thus the heart wants more oxygen. The person's potassium levels drop distinctly. When you combine this and many other medical terms together you find the heart beats faster, is not getting enough oxygen, and the arteries to the heart are constricting shutting down the blood flow. Once the person stops the struggle and there is a time of cessation, this is when the heart shuts down. Dr. Vincent DiMaio wrote a letter to a police agency explaining the death of a person. In this letter he states "...Danger time for arrhythmias in individuals with excited delirium is immediately following the cessation of physical activity, when blood catecholamine concentrations continue to rise while potassium levels drop..." (DiMaio, n.d.).

The term excited delirium came around in the early 1980's but was more widely known now in the early 2000's due to media coverage. In a book by Doctors Theresa and Vincent DiMaio they discuss the first references to excited delirium being within literature found in psychiatric books during the mid to late 19th century. This information was found not only in the United States but also in Europe (DiMaio & DiMaio, 2005). There were multiple names given for deaths that occurred during this time, and all seemed to have common attributes and were given the following different names "...acute exhaustive mania, Bell's mania, fatal catatonia, acute exhaustive psychosis, etc" (DiMaio, pg. 7). Physicians finally simplified their multiple diagnoses and started titling these deaths as "Bell's Mania". This diagnosis was given to the newly discovered disease because patients were dying and no one knew why. "Bell goes on to state that there are no residual impairment of mental integrity and the cure is permanent" (DiMaio, pg 8). Throughout the study findings showing death occurring at various time frames; within minutes or even hours after the start of the symptoms.

No one can say for sure what exactly brings on, or initiates the process within the body for excited delirium to occur. Within the law enforcement field there have been several tools that people have tried to link to this type of death, especially where the death occurs while in custody. There was much criticism of the Taser when it first came out and much more since there have been in custody deaths after the use of a Taser. Taser International Inc. who created and produces the Taser has done extensive research into how the Taser works what within the body it affects, and its safety. In an article written in the Palm Beach Post Taser International has been producing stun gun type devices since the 1990s (Kahn, March 2007). It was not until 2003 that the upward swing started for Taser and many agencies began investing in this new tool. Taser International was begun in 1993 by two brothers Rick and Tom Smith. They initially

started developing a stun gun, and said in their corporate web page they wanted to "...developing a more effective and safer use of force option for citizens and law enforcement" (Corporate History, 2007). The brothers then created an Air Taser in 1994, and this was able to track its deployments/uses thus making persons accountable for when it is used. This is the same time, June 1994, that "...ATF certified that Air Taser was not a firearm and is not subject to the stringent regulations that were placed on the original Taser device developed by Jack Cover" (Corporate History, 2007). Several more years of research product alignment and technology was upgraded which lead us to the more commonly known and most currently used form of Taser, the X-26. This Taser has "...dynamically influenced significant changes in over 11,000 law enforcement agencies worldwide" (Corporate History, 2007). A study was conducted in December of 2001 by the National Institute of Justice on the effects pepper spray may or may not have on a person's ability to breathe. This study focused on positional restraint after exposure to Oleoresin Capsicum (OC) spray. The basis of their findings was suggested there was no significant risk to persons who had inhaled OC even in conjunction with positional restraint. There were findings that it did have some effect on persons elevating their blood pressure. The study looked at several positions including sitting, and restrained. This study measured not only positions but included body weight, size, medical issues such as asthma, and history of smoking. This study was conducted and is included in material relative to excited delirium within literature for an in custody sudden death symposium. There was no significant results found that conclude OC spray causes positional or other asphyxiation. (Chan, et al, 2001). In an article by Lt. Benner for Police Chief Magazine he found there was a main problem when looking at and for excited delirium. It was not as of 1996 listed as a medical or psychiatric condition, and was still in a descriptive phase. He found increased attention was laid upon this new diagnosis for an unexplained death. Researched had realized that cocaine related emergencies had jumped and thus the increase in in-custody deaths associated. Departmental training in recognizing this condition had not been conducted at the levels needed, and there were published symptoms related to excited delirium. They are; bizarre and aggressive behavior, shouting, paranoia, panic, violence towards others, unexpected physical strength, and sudden tranquility. These issued for EDS were discussed at the IACP conference as far back as 1995 (Benner & Isaacs, 1996).

Much of the research found within this topical realm had no conclusive diagnosis or information on how to stop the occurrence of excited delirium. Many of them recognize it, and suggest how to best handle it. In a news report from ABC there is a question of the validity of this new "diagnosis" excited delirium. Many are skeptical, yet most doctors who have had persons that have died from the same set of symptoms and/or circumstances. "They tend to be overweight males, high on drugs, and display extremely erratic and violent behavior." In most cases found to be excited delirium the victims also have been under some sort of stress. The article spoke of the introduction of the term excited delirium starting as far back as 1980, and was introduced along the same time as the start of the cocaine craze. Doctors in this article are stating there is a real clinical diagnosis for this disorder, but the American Medical Association refuses to recognize it. Doctors in this study have linked the adrenalin released by the body during the stressful event in combination with the high levels of cocaine, or some other drugs

to excited delirium deaths (Goldman, 2007). An article published in Police Magazine focused on some very basic concepts for Excited Delirium and officer response to it in the field. As in previous articles this one discusses the many signs of this medical condition, and lists them as violent behavior and incredible strength among others. This study showed no single cause as to what is causing this delirium, and lists deaths attributed to Excited Delirium after contact with pepper spray, Tasers, and some restraint techniques. No one instance has been linked with this type of death. It is suggested that officers upon first realizing they may be encountering a person who is exhibiting some signs of Excited Delirium to call for medical personnel and have them stage down the street, and when given the opportunity have the subject immediately evaluated. It is normally too late when medical personnel are called after the subject has collapsed (Ho, 2007).

Methods

Present research was conducted by utilizing three different means. Research surveys were distributed to all accredited agencies within the State of Florida utilizing a Florida Police Accreditation Coalition web based bulk e-mailer. This allowed access to approximately 160 accredited agencies throughout the State of Florida. These types of agencies were selected as they meet the requirements set forth by the Commission for Florida Accreditation to which my agency is also accredited. This means all agencies responding to the survey will meet, and adhere to the same set of criteria and standards as the Fort Pierce Police Department. There was no set methodology set forth such as size, geographic location. The surveys were sent out randomly. The survey consisted of 13 questions that were based upon yes or no answers. Some answers required a bit of explanation. There was no need for any Lykert scales or quotients.

The second form of research for empirical data is personal interviews. Interviews with Dr. Garavaglia and Dr. Mittleman were conducted. Both doctors are forensic pathologists. Dr. Mittleman is the Chief Medical Examiner for the 19th Judicial Circuit, and Dr. Garavaglia for Orange County. Both have had multiple dealings with excited delirium.

The final means of gathering data will be from personal/own agency, Fort Pierce Police Department, information and case file review. Our agency has had the misfortune to experience two deaths that were attributed to excited delirium. Review of coroner reports and facts surrounding the incidents and information leading up to the time of death were considered, and then filtered into this paper.

Results

Tabulation of survey information reflected a return rate of 33 responses equating to 21%. 14 of these agencies have had in custody deaths. Of these deaths three were self termination. The remaining eleven deaths can be connected to abnormal behavior, combative actions, and aggressiveness in general. The time frames for distress to death were all under 5 minutes with the exception of one being 10-20 minutes. All

agencies performed CPR and requested the response of medical personnel. All parties had narcotics in their system, and the most pronounced of these was cocaine.

In speaking with M.E. Dr. Mittleman he noted behavior of people while experiencing excited delirium is "unreal" almost super human strength. Dr. Mittleman stated "...like running down the street after jumping out of a two story window". I asked Dr. Mittleman if he had any experience with persons being affected by excited delirium who have not been on drugs. Dr. Mittleman reported he has no information relating excited delirium to anyone who has no history and no drugs in their system. That all deaths affiliated with excited delirium as he recalls have had drugs in their system. I asked Dr. Mittleman if he can attribute excited delirium to one specific drug, and he could not. Dr. Mittleman stated there are many different drugs he has seen in the system of a person effected with excited delirium ranging from cocaine to psychiatric medications that were prescribed. I asked Dr. Mittleman when he recalled his first diagnosis of excited delirium and he stated it was in the early 1980's in Miami Dade Florida. Dr. Mittleman added that these types of deaths were happening farther back than this, but persons did not realize what it was, and had no name for it. Dr. Mittleman offered that through his research on the topic this has been happening all the way back to times when it was legal to use cocaine, and that these types of unexplainable deaths, and irrational behaviors are what instigated the illegalization of cocaine, which is still law today. I asked Dr. Mittleman if he knows of a way to prevent excited delirium, and he did not. Dr. Mittleman stated that his experience with it is once the process starts there is no way to deviate from the course that the body takes. I asked Dr. Mittleman if he saw any correlation between the use of an electro muscular device, more commonly know as a Taser, and he did not. Dr. Mittleman stated he has had to rule on two cases here in St. Lucie County recently. Both of these cases involved the use of a Taser on drive stun. Dr. Mittleman stated these deaths were not related to the use of the Taser; "...if they were as a result of the application of the Taser the persons would have died when the Taser was applied". Dr. Mittleman did rule these deaths as a homicide which may confuse some people until they review the literal term of homicide. The killing of one human being by another. Homicide is of three kinds: justifiable, as when the killing is performed in the exercise of a right or performance of a duty; excusable, as when done, although not as duty or right, yet without culpable or criminal intent; and felonious, or involving what the law terms malice; the latter may be either manslaughter or murder. Dr. Mittleman stated that both deaths were ruled this, by clinical definition.

Dr. Garavaglia was interviewed by phone, and offered similar if not the same information as Dr. Mittleman. Dr. Garavaglia had heard of the processes spoken of earlier in this paper of trying to lessen/decrease the possibility of excited delirium by cooling the body, and calling for medical personnel when in doubt, but also did not know if any of this would work. Dr. Garavaglia was called away to an emergency autopsy and we were unable to make further contact as of the writing of this paper.

After reviewing both incidents occurring within the Fort Pierce Police Department and their in custody deaths none of the officers involved were found to have acted outside of their prescribed and appropriate responses and levels. All officer involved actions in these cases were found to be legal proper and just. The 19th Judicial Circuit also reviewed the files and did nor pursue criminal action. Moreover the medical examiner revealed both deaths were attributed/caused by excited delirium. Both

persons were of different cultural and socioeconomic lifestyles and areas of the country. But both persons had several attributes listed above in this paper such as drug use, and medical conditions.

Discussion

The Fort Pierce Police Department has had two in custody deaths within the last five years. The first case involved Law Enforcement On February 21, 2006, working a detail at Lawnwood ER. Officers were trying to remove an individual who had become disorderly and was causing a disturbance in the emergency room waiting/triage area. The individual refused to leave when asked several times to do so by Officers. Officers warned the individual that if he continued to be combative and refuse to leave he would be Tased. The individual continued to refuse to leave, and became more combative and threatening, at which time he was drive stunned. The individual continued, after being drive stunned 2 times, to refuse commands, and was forcefully handcuffed. Additional Officers arrived during this commotion and assisted the original officers with the handcuffing process. The individual still refused to cooperate by not walking out of the waiting room area on his own accord, and had to be placed onto a gurney, involuntarily, and wheeled out of the hospital. Between the time he was wheeled out of the hospital and the officers made it to their vehicles, it was noticed by one of the Officer that the individual did not appear to be breathing. Officers checked the individual for breathing and pulse. Finding none, an officer was sent ahead to inform E.R. staff of the situation. Officers raced the individual back into the E.R., where staff immediately tended to his needs. The following is a step-by-step description of the incident:

The second case occurred when officers were summoned to a disturbance in the parking lot of the Pilot Travel Center on Okeechobee Rd. in Ft. Pierce. Prior to officer arrival, several individuals had witnessed the subject acting in a manner which had been variously described as bizarre, paranoid and out of control. The subject was initially observed driving a large Budget Rental truck while following two of the witnesses into the Pilot parking lot. The subject was seen by several people throwing things from his truck acting irrationally. Driven by concern some of the witnesses went to the front of the Pilot Travel Center where they had seen the officer's vehicle in the front. Officers responded to the rear of the Pilot Travel Center and observed the subject running around his truck. The subject was observed throwing oil at or around his truck while yelling that someone was trying to kill him or steal his belongings. Officers made contact with the subject and tried to calm him. This did not work, and officers felt it necessary for the safety of the subject and those in the immediate area to place the subject in restraints. The first officer was able to do this after a brief struggle, and placed him in the rear of his patrol vehicle. The subject continued his bizarre behavior and actually even asked the officer to call the police. The officer was in full police uniform and had arrived in a marked patrol vehicle. The originating officer had also requested an additional unit be sent to him. The additional officer arrived on scene after the subject had been secured in the back of the patrol car. While on scene, the second officer stated he observed the subject thrashing about in the back of the patrol car. Both officers then patted the subject down as it had been too risky before the arrival of

the back up unit to conduct the search alone. The subject was then taken from the back of the car where he attempted to flee from the officers and was subsequently taken to the ground. While on the ground the subject resisted officers and was thrashing and kicking at the officers. The subject began to violently resist the officers. Both officers continued to verbally direct the subject to stop resisting and to calm down. The subject's resistance grew to a level necessary to escalate the level of force, and he was then warned several times if he did not stop resisting, and calm down he would be Tased. The subject did not calm down and officers elected to resort to pain compliance and not full deployment of the Taser. The subject was then given a drive stun to the rear shoulder area for the 5 second pre-programmed cycle. The effects of the Taser were not evident, and the subject continued to struggle and the officer then applied two additional Taser drive stuns to the subject, but did not administer the full 5 second application, and was unsure, given the subject's level of resistance, whether the Taser even came into contact with the subject as he continued to thrash about during this attempt to subdue him. Shortly after the third and final Taser deployment, the subject stopped resisting the officers. Noticing that the subject did not appear to be breathing, the officers checked for the subject's pulse. Detecting only a weak pulse, the officers initiated lifesaving measures/CPR. The officers requested emergency medical providers (rescue) be dispatched to the scene. The subject never regained consciousness and was declared dead upon arrival at the hospital.

In both of these cases there were drugs found in the system of the subject persons. Both persons were acting irrationally, yet there were separate and different actions also. This lends credence to the claim of not needing a specific set of criteria for this excited delirium to occur. One subject had a long medical history and the other did not. One was physically fit, not obese, and the other was obese, and not physically fit. Both subjects did not receive the full effects of a Taser deployment, and only felt pain compliance. The Taser when not fully deployed does not affect any of the muscles within the body.

As you can see from the results portion there is no systematic analysis that may be done to find out a specific cause and correlation of excited delirium. The results of the survey conducted shows less than half of the respondents have had an incident involving in custody deaths; finding that not all of these deaths were a result of excited delirium lessened these numbers also. Within the research gathered, there was no direct specific link to excited delirium. There was a large proportion of the population surveyed that did have similar behavior. Most of the persons who died were acting abnormal, were resisting law enforcement efforts, and were aggressively active. All subjects had drugs in their systems, with the largest number of persons having ingested cocaine. Ten of the eleven relative deaths occurred in less than five minutes after the struggle/incident had stopped. Five of these occurred in less than thirty seconds. Several of these deaths did utilize "tools of the trade". Some of these were pepper spray, handcuffs, Tasers, and leg restraints. Ten of the eleven relative in custody deaths surveyed did occur within the last five years.

Within the survey questions agencies were asked what training has been implemented in reference to excited delirium. Most of the agencies have introduced additional training on recognizing some "warning signs" of excited delirium, amended policy, and included Taser training for all personnel. This study was limited to that

information gleaned from agencies who responded. In the future I suggest doing a specific agency mailing, or e-mailing, and not using a bulk mailer. The idea of this group e-mailing was good in the number of agencies available to contact, but the response rate was low. I also suggest making the survey accessible on line. There are limitations to this study as the specific parameters of information are unable to be maintained. There are many different causes or contributors to excited delirium and not one thing can be pin pointed, which gave way to conduct this research in the first place. Finding through this process that there is no direct nexus to a specific event, tool, or drug limits the scope of research.

Recommendations

There are some recommendations that may be made based upon information gathered. New protocol and teaching is recommended for those employees who deal with the public in general, and in our detention facilities. I recommend law enforcement personnel be made aware of this syndrome, and its symptoms. I recommend when able, law enforcement notify medical personnel of the situation, and possibility of excited delirium, and request their response. I recommend all personnel monitor subjects closely after incidents of aggressive behavior until they have deescalated safely.

Commander Katherine "Kitty" England has been employed with the Fort Pierce Police Department since 1991. She has worked in several divisions to include Patrol, Criminal Investigations, Traffic and the Office of Professional Standards. She was Detective of the Year in 1991 and Manager of the Year in 2006 & 2007. Kitty was the first female SWAT member and is only the second female Lieutenant at her agency. Kitty is a graduate of Leadership St. Lucie Class #25 and a member of the National Association of Women Law Enforcement Executives (NAWLEE). Kitty has a bachelor's degree in Business from Nova Southeastern University and a Master's degree in Public Administration from Troy State University.

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Appendix A

Interview Questions for Doctors Mittleman and Garavaglia

1. What is excited delirium?
2. What causes excited delirium?
3. Can excited delirium be prevented?
4. Have all excited delirium cases been related to drugs?
5. When do you recall seeing the first diagnosis of excited delirium?
6. Is there any correlation between the use of an EMD with excited delirium?

Appendix B

In-Custody Death Survey

Katherine G. England

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Senior Leadership Class #12

1. Has your agency had any in custody deaths?
Yes _____ No _____ (If no please skip to number 12.)

2. Did any of those deaths occur within the last 5 years?
Yes _____ No _____

3. Was pepper spray used in any of the in custody death cases?
Yes _____ No _____

4. Was an electro muscular disruption device, more commonly known as a Taser used in any of the in custody deaths?
Yes _____ No _____ If yes, how many? _____

5. Was there a different tool or restraint device utilized during the incident leading up to the in-custody death? If so what was it and how was it utilized?

6. What were the circumstances surrounding the death?
(Please include any actions before, during and after death)

7. Was there a struggle with officers or others before the death?
Yes _____ No _____

8. At what point did the person show signs of distress?
During struggle _____ 0-30 seconds after struggle _____
31-60 seconds after struggle _____ One minute to 5 minutes after struggle _____
Other _____

9. What actions did officers take upon recognition of this distress?

10. Were any toxicological effects found during autopsy?
Yes_____ No_____ If yes what were they?

11. If any what drugs were being utilized by the person?
Cocaine_____ Heroin_____ Methamphetamine_____ Other_____

12. Did that person have a *history* of drug use, violence, and/or medical problems?
Yes_____ No_____

13. What training have you found and or implemented to inform your personnel about excited delirium?

14. Agency Name_____

Results Tabulated Below.

Appendix C

Agencies with history of In Custody Death	W/in 5 yrs	Pepper Spray	EMD	Other Tool	Synopsis	Struggle	Distress Time	Ofc. Action	Drugs if any	History	Training Implemented
Altamont Springs Police Department	N	N	N	Cuffs	W/M acting abnormal, physical restraint hands on - 10/15	Y	1-5 min	CPR	Cocaine	Y	General, CPR, PPE, Roll Call
Boca Raton Corrections	N	N	N	N	Self Termination	N	N/A	N/A	Alcohol	N	In Service Training on E/D
Collier County Sheriff's Office	Y	Y	Y	N	Pursuit, resisting arrest with violence, cardiac arr. In water	Y	0-During struggle	CPR, called EMS	Cocaine	Y	Taser training includes E/D
Collier County Sheriff's Office	Y	Y	Y	N	Pursuit, Resisting arrest with Violence, Cardiac arr. On land	Y	0-During struggle	CPR, called EMS	Cocaine		Taser training includes E/D
Collier County Sheriff's Corrections	Y	N	N	N	Inmates Self Terminated	N	N/A	CPR	N/A	Y	In Service Training on E/D
Department of Corrections Orlando	Y	N	Y	N	Acting abnormal, screaming thrashing	Y	10-20 MIN	Called EMS	Y	Unknown	Training on symptoms of E/D
Hollywood Police Department	Y	N	Y	N	Aggressive action-fight between two subjects	Y	0-30 Sec	EMS	Y	Y	Changed Taser SOP
Lakeland Police Department	N	N	N	N	Self Termination	N	N/A	Contact EMS	Y	Y	Taser training includes E/D
Lee County Sheriff's Office	Y	N	Y	N	Disorderly combative, resisted arrest Pursuit, Hallucinating, incoherent resisting arrest.	Y	1-5 min	First Aid, called EMS	Y	Y	Monitor and look for E/D
Martin County Sheriff's Office	Y	N	Y	Cuffs		Y		EMS on scene	Y	Y	Taser training includes E/D
Melbourne Police Department	Y	N	Y	N	Burglary, subject armed with broom	Y	1-5 min	Called EMS	Y	Y	E/D training, New E/D policy

Arrest-Related Death Evidence Collection

1. Highly Perishable Evidence (some items repeated below)

- a. Get the AED (Automatic External Defibrillator) or cardiac monitor downloads (including rhythm strips and technical operational downloads). This is usually erased when the next paramedic shift starts. This information can eliminate "electrocution" by the TASER CEW (Conducted Electrical Weapon) 95% of the time. However, it is erased 80% of the time. Note that there can be 4 defibrillators: (1) Squad car, (2) Paramedics, (3) Ambulance, and (4) Hospital.
- b. Maintain as evidence the CEW wires and probes! Microscopic analysis of the probes and wires will often show that no electrical current was delivered (as one probe missed) and eliminate the TASER CEW as a factor.
- c. Core (rectal or liver) body temperatures at as close to time of collapse as possible by medical personnel. Not considered important by EMS or Emergency Department (ED) staff for therapy but important for Excited Delirium diagnosis.
- d. Paramedic pulse oximeter recording if available.
- e. End tidal CO₂ measurement from paramedics during CPR (cardio-pulmonary resuscitation) or after they intubated the subject. Often not recorded.
- f. Antemortem (pre-death) blood sample from ED in proper preservative tube for "quantitative" analysis – not just "qualitative" analysis.
- g. If postmortem blood sample – get several blood samples (especially peripheral samples) and place in proper preservative tube for quantitative analysis – to avoid continuing metabolism within the tube.

2. Important Requests for ME (Medical Examiner)

- a. Hair sample and chronic drug use analysis (\$75). At least save a head hair sample (pencil thick when twisted) and a pubic hair sample.
- b. Mash Miami brain test (\$400). (1-800-UM-BRAIN and www.exciteddelirium.org)
- c. Due to the importance of the hair and brain test, the LEA (Law Enforcement Agency) should offer to pay for them. The \$475 is nothing compared to the typical \$1 million settlement for an ARD (arrest-related death).
- d. Save the heart (histologic heart blocks may be very important).
- e. If any TASER probes were within 5 cm (2 inches) of the heart, ME should measure the exact distance (in millimeters) from the tip of the probe to the outer surface of the heart. Document all probe locations.
- f. Save blood sample for genetic testing for "long QT" syndrome.
- g. Collect and analyze gastric contents.

3. Acute Medical Information.

- a. Body Core (rectal or liver) Temperature at time of death and as close to collapse as possible.
- b. Collect 10 ml (milliliters) of blood as soon as possible after ED arrival for later quantitative drug testing.
- c. Document (ideally photograph) all TASER probe and wound locations. Record if they removed the probes or subject arrived without.
- d. Within 24 (preferably less than 12) hours of collapse, brain samples must be properly collected and frozen. Call 1 800 UM BRAIN (**also www.exciteddelirium.org**) for shipping instructions.
- e. In suspected cocaine, methamphetamine, PCP, etc. smoking cases, swabs of mouth and bronchial tree are helpful for chemical analysis.
- f. Remind treating physicians to keep documentation objective and don't write about things they do not understand. Occasionally hospital records will include statements about a "TASER" wound even though there was no TASER CEW used near that specific location.

4. Chronic Medical Information.

- a. Obtaining hair and toe-nail samples. Twist strands of longest head hair available like a lock, about as thick as a pencil lead, hold together to keep strands aligned as you cut as close to skin as possible. Transfer lock to tin foil or paper, fold (to hold together), and secure. Collect similar samples from longest pubic/groin hair.
- b. Obtain all available past medical records.
- c. Obtain printouts from pharmacies used by suspect for past 2 years.
- d. Obtain all criminal justice records.
- e. Obtain all rehabilitation and treatment records.

5. Circumstances Regarding Arrest.

- a. Distance CEW fired, probe spread, **probe location**, and duration of cycles.
- b. TASER CEW effects (such as change in behavior).
- c. Subject's influence (drugs, alcohol, emotionally disturbed).
- d. Any other use of force employed?
- e. Was an AED, defibrillator, or cardiac monitor used?
- f. Did the AED report a shockable rhythm?
- g. Is there a printout (download) from the AED or cardiac monitor?
- h. How long between the CEW exposure and the subject's collapse?
Specifically detailed chronicle of all witnessed behaviors, actions, inactions, physiological status, etc.
- i. Was the subject walking, fighting, or talking after the exposure?
- j. MEs contact info or supporting info from medical attendants and ED.
- k. Hospital exam information (if conducted).

6. Interviews.

- a. Treat the EMTs (Emergency Medical Technicians) and Paramedics etc at the scene like any other witnesses. Get complete statements from them about what they observed and what interventions they made. Very often, they can make medical observations that the LEOs (Law Enforcement Officers) might not realize are important but

- they will have forgotten by the time their depositions are taken two to three years later. Where did the probes land? *Don't assume that their standard report has enough information — it does not.*
- b. Try to get eyewitness statements that address the rapidity with which the subject went from screaming, struggling, and yelling to unconscious, not breathing and pulseless.¹
 - c. Get statements that include whether or not the subject could be heard to be breathing, screaming, yelling, etc throughout their confrontation against LEOs efforts to capture, control, and restrain. Screaming and yelling require that air is moving over the vocal cords and demonstrates that at least some degree of ventilation had to take place. How much yelling and screaming?
 - d. Debrief LEOs and witnesses regarding words and actions manifested by subject. Get details of patterns of walking, talking, gestures, facial expressions, breathing, pulse, etc. Ask interviewees to replay their memory with attention to DUI (Driving Under the Influence)/DRE (Drug Recognition Expert) type details. Sounds, even grunts, growls, and snarls, are important. Get collaborative reports.
 - i. Was suspect growling? How?
 - ii. What words could you make out?
 - iii. Huffing and puffing?
 - iv. Sweating?
 - v. Drooling?
 - vi. Eye movements?
 - vii. Balance?
 - e. If subject is only injured and survives, debrief as soon as possible about subjective feelings, thoughts and drug effects. They were the only ones inside their bodies and looking out so ask how they saw and heard the world. Don't translate anything into your own words but describe mannerisms and expressions accompanying their descriptions.
 - f. SOUNDS: Ask all witnesses to describe any unusual sounds they heard. If they describe sounds like "arcing" or "electrical short" there was probably a connection break and the suspect was not getting current delivered at that time. Even "clicking" heard in a noisy situation or from > 10 ft, in a quiet situation, is indicative of a broken connection. Like a car or refrigerator, when the TASER CEW is making noise, there is usually something wrong. Adverse witnesses love to go on about the electrical noise, thinking they are hurting the police when the opposite is true.

¹ Remember a respiratory death takes minutes whereas a cardiac death takes only a few seconds. Try to specifically determine the time sequence as clearly and carefully as possible in the early phase of the investigation. Advise LEOs to collect as much information about the passage from activity to unconsciousness as possible. The sequence of events for a sudden cardiac death as opposed to a respiratory death are markedly different and chronicling exactly what happened, how fast, when, and whether there was resistance, exertion, struggling, or fighting until "all of a sudden" or like a "light switch" things changed can be most important information.

7. Evidence Collection.

- a. Photos of wounds and CEW probe or drive-stun impacts with ruler.
- b. Photos showing distance of probe or drive-stun spread (scale).
- c. Keep the original CEW battery in the CEW (DO NOT Remove). This will keep the integrity of the internal clock.
- d. Do not discard probes or wires (treat them as evidence). Do not let EMS place probes in "sharps" container as information can be gathered from the probes and wires as to whether or not they actually delivered current.
- e. Download CEW data within 48 hours of the event and maintain evidentiary copy of download (including time drift)
- f. Collect 2–3 AFID (Anti-Felon Identification) tags and note their location; this will be helpful if multiple CEWs or cartridges were deployed.

8. Medical/Autopsy Data and Tissues

- a. All treatment records
 - i. EMS
 - ii. Emergency department
- b. Autopsy report
- c. Autopsy microscopic slides (if any were prepared)
- d. Autopsy gross tissues (if any were retained)
 - i. Heart is especially useful

9. If the CEW Did Not Perform as Expected:

- a. What was the failure or challenge?
- b. What was the subject wearing (especially, multiple layers, thick layers, loose clothing, etc.)
- c. Was the CEW dropped or subject to a high-moisture environment?
- d. What were the operating conditions?
- e. Did the CEW fire?
- f. Did LEOs hear loud arcing – especially across the front of the CEW?
- g. Drive-stun or probe deployment?
- h. When was a last successful download or spark test done?

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Excited Delirium Checklist

Excited delirium or excited delirium syndrome is only one form of potential sudden death that law enforcement officers may encounter. Other potential causes of unexpected arrest-related deaths include, but are not limited to: SUDEP^{1,2} (sudden unexpected death in epilepsy), sickle cell sudden death,³ various cardiomyopathies,⁴ drug induced arrhythmias (including those caused by alcohol^{5, 6} and marijuana⁷⁻¹⁰), psychiatric arrhythmias (whether due to schizophrenia¹¹ or medications¹²), and severe coronary artery disease.

Present?	Criterion
911 Call – Emergency Contact for Assistance	
	1. Critical call phrases include, "He just freaked out," "just snapped," "flipped out," or a person is "running around naked." ¹³
Law Enforcement	
	2. Agitation, screaming, extreme fear response or panic ¹⁴⁻¹⁸
	3. Violence, assault, or aggression towards others ¹⁸⁻²¹
	4. Suspicion of impending death. Typical comments include, "I'm dying," "Please save me," or "Don't kill me" ²²
	5. Incoherence or disorganized speech. Grunting or animal sounds ^{21, 23}
	6. Clothing removal inappropriate for ambient temperature or complete nudity. ^{18, 24-26}
	7. Disorientation or hallucinations ^{18, 27-30}
	8. Mania, paranoia, anxiety, or avoidance behavior ^{14, 18, 31-34}
	9. Constant motion or hyperactivity ^{14, 30, 35-37}
Capture, Control and Restraint of Subject	
	10. Extreme or "super human" strength ^{21, 33}
	11. High threshold of or imperviousness to pain ^{23, 26}
	12. Extreme stamina ^{38,23}
	13. Brief quiet period before collapse likely corresponding with respiratory arrest ^{14, 17, 23, 39}

Emergency Medical Services Contact and Intervention	
	14. Presenting rhythm of PEA (pulseless electrical activity) or asystole. ^{38, 40-43} Also documented by "No shock advised" with automatic external defibrillator ⁴²
Emergency Department	
	15. High core body temperature. ^{15, 16, 21, 31, 44, 45}
	16. Acidosis (acidic blood) ^{23, 46, 47}
	17. Rhabdomyolysis (if suspect is resuscitated). ^{15, 45, 48}
Law Enforcement/Forensic Investigator Death Investigation	
	18. History of chronic stimulant abuse or mental illness ^{14, 19, 27, 32, 37, 40, 49-52} History of violence or drug related arrests, mental health histories and treatments, and drug rehabilitation interventions, etc.
	19. Damage to shiny objects such as glass, mirrors and lights. ²³ Reported behaviors may include attacking a squad car light bar or charging oncoming traffic at night. Occasionally generalized vandalism.
Pathologist – Medical Examiner Investigation	
	20. Minor injuries from fighting against restraints (e.g. handcuffs, hobbles).
	21. Positive Mash (central nervous system biomarkers) test for dopamine transporter assay and heat shock protein. ^{15, 31, 32, 53-57}
	22. Positive brain and hair toxicology screen for chronic stimulant abuse. ^{53, 58} ⁶² Post-incident drug levels may be low to negative.

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Notes:

A syndrome is an aggregate of signs and symptoms that define a medical condition. Not all persons with a certain syndrome have all the same signs and symptoms. Not all cases of a syndrome result from the same cause. For example, some persons with carpal tunnel syndrome will have numbness and tingling, while others will have weakness and pain. Also, some persons with carpal tunnel syndrome will have it because of trauma, while others will have the syndrome because of pregnancy, diabetes, rheumatoid arthritis or thyroid disease.

Persons with the excited delirium syndrome will have various combinations of some of the signs and symptoms listed above. The cause (etiology) of the excited delirium syndrome in any individual may be due to one or more of a number of conditions. The most common conditions are mental illness and illegal stimulant abuse (especially cocaine and methamphetamine).⁴⁰

Because the term "excited delirium syndrome" has not been widely used until recent years, many physicians do not recognize the term even though they may be very familiar with agitation and deaths due to drugs and other conditions.⁶³ It is important to avoid the distraction of the various terms that have been applied to this syndrome. For example, what is now referred to as excited delirium^{14-16, 26, 32, 33, 36, 38-40, 45-48, 51, 54, 55, 64-71} or agitated delirium^{41, 57, 72-117} has also been called: Bell's mania,³⁰ acute exhaustive mania,¹¹⁸ acute delirious mania,³⁰ delirium grave,³⁰ typhoma,³⁰ acute delirium,³⁰ manic-depressive exhaustion,²⁴ excited catatonia,⁹¹ lethal catatonia,¹¹⁹ and neuroleptic malignant syndrome.^{19, 26, 44, 74, 119}

Statistical Confidence:

There must be at least 5 positive criteria to diagnose excite delirium syndrome. For 12 or more positive criteria the confidence level is at least 99.9%. For less than 12 positive criteria the confidence depends on the number of criteria for which information is available.

For example, the brain and hair tests are, unfortunately, typically not done. Often the blood tests for rhabdomyolysis is not done. In this case there will only be information on 19 criteria. If 8 of these 19 criteria were positive then the confidence in the diagnosis would be 93%.

		Number of Positive Criteria							
		5	6	7	8	9	10	11	
Number of Criteria With Information ↓	10	64%	82%	93%	98%	99%	99.9%		
	11	62%	81%	91%	97%	99%	99.8%	99.9%	
	12	61%	79%	90%	96%	99%	99.6%	99.9%	
	13	60%	78%	89%	95%	98%	99.4%	99.8%	
	14	60%	78%	89%	95%	98%	99.2%	99.8%	
	15	59%	77%	88%	94%	97%	99%	99.7%	
	16	59%	76%	87%	94%	97%	99%	99.6%	
	17	58%	76%	87%	93%	97%	99%	99.5%	
	18	58%	75%	86%	93%	97%	98%	99%	
	19	57%	75%	86%	93%	96%	98%	99%	
	20	57%	74%	86%	92%	96%	98%	99%	
	21	57%	74%	85%	92%	96%	98%	99%	
	22	57%	74%	85%	92%	96%	94%	99%	

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Excited delirium

From Wikipedia, the free encyclopedia

Excited delirium is a condition that manifests as a combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent and bizarre behavior, insensitivity to pain, elevated body temperature, and superhuman strength.^{[1][2]} Excited delirium is sometimes called **excited delirium syndrome** if it results in sudden death (usually via cardiac or respiratory arrest), an outcome that is sometimes associated with the use of physical control measures, including police restraint and tasers.^{[1][2]} Excited delirium arises most commonly in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine.^{[1][3]} Alcohol withdrawal or head trauma may also contribute to the condition.^[4]

The diagnosis of excited delirium has been controversial.^{[5][6]} Excited delirium has been listed as a cause of death by some medical examiners for several years,^{[7][8]} mainly as a diagnosis of exclusion established on autopsy.^[1] Additionally, academic discussion of excited delirium has been largely confined to forensic science literature, providing limited documentation about patients that survive the condition.^[1] These circumstances have led some civil liberties groups to question the cause of death diagnosis, claiming that excited delirium has been used to "excuse and exonerate" law enforcement authorities following the death of detained subjects, a possible "conspiracy or cover-up for brutality" when restraining agitated individuals.^{[1][5][6]} Also contributing to the controversy is the role of taser use in excited delirium deaths.^{[3][9]} The American College of Emergency Physicians has officially recognized excited delirium as a unique syndrome^[10] and "rejects the theory" that excited delirium is an "invented syndrome" used to excuse or cover-up the use of excessive force by law enforcement.^[11]

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Introduction



Over the past decade, increased attention has been paid to the sudden and seemingly inexplicable deaths of some highly agitated subjects being held in police custody. In most of these cases, the force required to restrain or incapacitate the suspect was not sufficient to cause death.

Our colleagues in Miami-Dade County, Florida, first described the syndrome of excited delirium associated with cocaine abuse. The symptoms of excited delirium include bizarre and/or aggressive behavior, shouting, paranoia, panic, violence towards other people, unexpected physical strength, and hyperthermia. Throughout the United States and Canada, these cases are frequently associated with psychostimulant abuse, representing the extreme end of a psychiatric continuum of drug abuse effects. However, reports of acute exhaustive mania, physical restraint, Pepper Spray or TASER and sudden death also have been reported that are not related to abused drugs, suggesting further that an underlying central nervous system disorder was the precipitating cause of lethality. Such victims of excited delirium have provoked allegations of police misconduct, unnecessary force and improper TASER deployment.

Medical examiners often have extreme difficulty in identifying the cause of death, but frequently drug intoxication is considered as a contributing factor or cause of death. While the precise cause and mechanism of these deaths remain controversial, we have demonstrated abnormalities in brain that define and confirm the occurrence of the excited delirium syndrome.

What to Know

Fact: ED is a medical emergency that presents itself as a law enforcement problem.

- Early and advanced coordination with EMS is key.

Fact: ED is not easy to recognize.

- Training is important so that dispatch or other personnel recognize behavioral signs.

Fact: ED containment requires backup personnel.

- Do not approach until it is safe to do so and always ensure several officers are present.

Fact: ED victims exhibit superhuman strength and are impervious to pain.

- Restraint positions and use of electronic control devices (TASER®) to override the CNS.

Fact: ED is a life-threatening emergency.

- Get the subject into acute medical care quickly.

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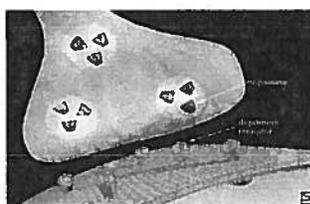
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What is Excited Delirium (ED)?

Excited delirium is a brain disorder.



This disorder is usually drug-related (cocaine or "crack", PCP or "angel dust", methamphetamine, amphetamine), but can occur in non-drug users as well.

The presentation of excited delirium occurs with a sudden onset, with symptoms of bizarre and/or aggressive behavior, shouting, paranoia, panic, violence toward others, unexpected physical strength, and hyperthermia. Hyperthermia is a harbinger of death in these cases.

Neurochemical systems in the brain are abnormal in this disorder. At the molecular level, excited delirium is characterized by dysregulated dopamine transporters (hyperdopaminergic state), elevated heat shock proteins (hyperthermia), and immediate early gene activation as a marker of paranoid aggression (c-fos protein). These molecular changes serve as biomarkers of the disorder.

While many factors are associated with sudden death in individuals requiring restraint for excited delirium, these individuals develop a disturbance in thought, behavior and mood, and become agitated and violent. This abnormal behavioral state is due to CNS mechanisms which are the cause of lethality. The brain controls the heart and respiration. Abnormal brain activity leads to the psychosis and sudden death.

History of Excited Delirium

While excited delirium is best characterized in cocaine users, medical examiners and forensic scientists have noted a similarity in psychiatric presentation between sudden unexplained deaths in custody and psychiatric states associated with or without drug abuse. This seminal work was first described by Dr. Charles Wetli and his collaborator David Fishbain in the mid 1980s, when the "crack" cocaine epidemic first hit the streets of Miami, Florida (Wetli and Fishbain, 1985). But this disorder was known more than a decade earlier.

In 1849, Dr. Luther Bell first described a "disease" resembling some advanced stage of mania and fever, distinguished as an overlooked and often unrecorded malady (Bell, 1849). This "exhaustive mania" was described in 40 cases by Dr. Bell where "exhaustion due to mental excitement" caused three quarters of these patients to die.



Similarly, a condition called neuroleptic malignant syndrome (NMS) was described in the 1960s as a potentially fatal complication of antipsychotic drugs. This highly lethal disorder is seen in patients taking dopamine (DA) antagonists or following abrupt withdrawal from DAergic agonists (Caroff et al., 2007; Friedman et al., 1985; Kosten and Kleber, 1988; Levenson, 1985; Strawn et al., 2007).

In their seminal 1985 paper, Wetli and Fishbain reported excited delirium in a cocaine body packer, and within the next few years, the syndrome was recognized in cocaine abusers

as well. NMS is usually associated with muscle rigidity, while the cocaine variant of the syndrome presents with brief onset of rigidity immediately prior to respiratory collapse (Kosten and Kleber, 1988). In 1988, Kosten and Kleber proposed that cocaine-induced excited delirium was a variant of NMS. Alternatively, NMS may be an attenuated version of acute exhaustive mania/excited delirium. There is no doubt that these three disorders represent a common brain disease that likely has a genetic risk for certain individuals.

Neurochemical Biomarkers of Excited Delirium

Recent studies by our group supporting the hypothesis that NMS and cocaine-induced excited delirium are related and due to a brain disorder, involves dysregulated dopamine transport (Staley et al., 1994, 1995b; Wetli et al., 1996; Mash et al., 2002; Mash et al., 2008).

Cocaine blocks the dopamine transporter (DAT, red plugs in the presynaptic membrane) which leads to an elevation of the neurotransmitter in the synaptic cleft (shown above). An elevation of DA activates postsynaptic receptors (blue plugs in the synaptic membrane) on receiving cells. Pathologic levels of DA in the synapse causes the paranoia, delusions and psychosis. Too much DA in the synapse causes a dysregulation in the centers of the brain that controls temperature. DA is known to be linked to the central command centers in brain

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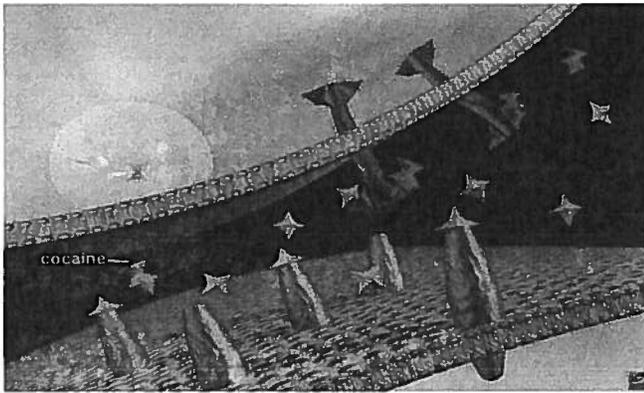
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emergence of paranoia and psychosis.

Cocaine-related excited delirium is always seen in chronic abusers. The brain on cocaine is "not the same" and has adapted to a new state. Many neurochemical systems are dysregulated, but the final common pathway is most likely linked to DA. Excited Delirium is characterized as a *hyperdopaminergic state*.

What is Excited Delirium ?

Wetli suggests that there are three related syndromes: (1) acute exhaustive mania, as described by Bell in psychiatric patients, (2) excited delirium, due to psychostimulants (cocaine, methamphetamine, MDMA) and psychiatric illness; and (3) the attenuated variant - NMS (Wetli, 2005; Wetli and Natarajan, 2005).

With advances in molecular genetics, the gene or genes and environment interactions that cause Excited Delirium will be identified. This will only be possible if the biospecimens are made available to fully characterize excited delirium as a brain disease.

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For Law Enforcement

Individuals suffering from ED should be viewed as psychiatric patients and require immediate medical attention. **ED is a medical emergency.** The video below illustrates a prime example of an excited delirium case.



The aggressiveness, hyperactivity, incoherent shouting, and extreme paranoia exhibited by the suspect in the video are always associated with ED. This suspicion is confirmed by the fact that the suspect was found to be hyperthermic as indicated by not wearing a shirt. Individuals often disrobe or are found naked. This person had an eventual cardiorespiratory collapse in the absence of lethal force. With a completed brain autopsy showing the biological signature of ED, it can be concluded that excited delirium played a role in this man's death. In order for police officers to avoid situations like the one shown, it is essential to understand and recognize excited delirium when it presents itself.

Signs and Symptoms

Victims of excited delirium display sudden onset of paranoia and alternate between calm behavior and extreme agitation. When confronted by police, who are invariably called to the scene, the victim intensifies the violence and paranoia. An intense struggle ensues, when the victim exhibits incredible "superhuman" strength and is impervious to the usual police techniques of pain control, including pepper spray, peroneal baton strikes, and in certain cases, TASER deployment. The intense struggle requires the efforts of many police officers, who are finally able to restrain the victim and apply ankle and/or wrist restraints. Usually, within minutes of being restrained, the victim loses all vital signs. Core body temperatures average 105 degrees. Resuscitation of these cases often results in a failed course of hospital treatment, characterized by a fatal sequence of rhabdomyolysis and renal failure.



Things to look for:

- Aggressiveness
- Combative
- Hyperactivity
- Extreme paranoia
- Unexpected Strength
- Incoherent shouting

Investigators must document what occurred at the scene. Record or note body temperature. Ask for EMS personnel to record the temperature of the person. Attention to details may help medical examiners in determining the cause and manner of death.

Treatments

Excited delirium is a medical emergency.

Patients exhibiting signs of excited delirium require supportive care immediately:

- Sedation with benzodiazepines

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- External cooling
- Intravenous fluids
- Maintain on cardiac and respiratory monitor
- ER treatment of rhabdomyolysis and hyperkalemia

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10 training tips for handling "excited delirium"

DIRECTOR'S NOTE: One of the missions of the Force Science Research Center is to bring the latest research (ours and others) to the law enforcement community. Excited Delirium is a very high profile, significant social problem that although rare in occurrence has been very costly to the LE in terms of the health and safety of all concerned, reputation of the profession and certainly financially in terms of lawsuits against officers, departments and community.

It is our hope that this newsletter, which combines the latest research with the resulting suggested policy and procedures, stimulates thoughtful discussion in the areas of policy, practice and training.

—Dr. Bill Lewinski, executive director, Force Science Research Center

A representative of a large insurer of law enforcement agencies advises that new criteria are evolving for dealing with a special type of EDP—the person in the violent throes of Excited Delirium.

Attorney William Everett, a former police officer, offers 10 recommendations he believes will help patrol officers better manage high-risk ED confrontations. He presented these last month [9/05] in Utah at a conference of LE administrators and government risk managers and elaborated on them recently in an interview with Force Science News.

Litigation stemming from in-custody deaths is not uncommon.

"In minimizing risk," Everett says, "agencies and officers should be aware of the latest developments in medical and scientific research and use those findings to develop protocols for dealing with ED."

Everett is associate administrator for the League of Minnesota Cities Insurance Trust, which provides liability coverage for more than 800 communities, and is also a member of the National Advisory Board of the Force Science Research Center at Minnesota State University-Mankato.

"Studies estimate that ED may be a factor in 50 to 125 in-custody deaths a year in the United States alone," Everett says. "Part of the problem seems to be that officers tend to see the bizarre and alarming behavior of a subject experiencing this condition as strictly a control-and-arrest situation rather than as a serious medical emergency that can be fatal.

"Fifteen to 20 years ago, it became important for officers and trainers to start thinking about distinguishing the difference between a combative drunk and a person in a diabetic crisis. Even though they may share some common behaviors, one needs to go to jail and the other needs to go to a hospital.

"Now, with the research that has been done on ED in the last few years, there's a need to distinguish between people who are just choosing to act in a violent criminal way and those who are doing so because of an underlying medical condition that is affecting them mentally and physically.

"When you put the latter subject in jail without proper medical attention and he dies, you have both a tragedy and a liability problem."

Excited Delirium has been described as "a state of extreme mental and physiological excitement," characterized by exceptional agitation and hyperactivity, overheating, excessive tearing of the eyes, hostility, superhuman strength, aggression, acute paranoia, and "endurance without apparent fatigue."

Officers' encounter this condition under "very consistent" circumstances, according to Chris Lawrence, defensive tactics coordinator at the Ontario Police College in Aylmer (ON) and a member of FSRC's Technical Advisory Board. Lawrence is recognized as a leading LE authority on ED. He will soon debut a column on ED and other LE issues for FSRC's strategic partner, PoliceOne at www.policeone.com.

The subject officers confront, often on a property damage or unusual behavior call, will be "acting in a bizarre manner, often partially clothed or naked," Lawrence reports. He will likely be incoherent or speaking in gibberish or what seems to be another language. He'll be yelling or screaming loudly, seem to

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be disoriented or hallucinating and may be foaming at the mouth or drooling. He may be sweating profusely or the opposite, his body temperature soaring and uncooled by perspiration. Glass often will somehow be involved in the encounter, reason unknown.

Usually ED symptoms are well underway when officers arrive, but lately Lawrence has found instances in which a subject is speaking calmly and rationally with officers and then suddenly explodes into ED. However the onset occurs, the condition, while relatively rare, is always high-risk, he stresses.

As officers try to gain physical control of the subject, his "extraordinary strength" will be "a central feature of the struggle." Several officers will be needed to overcome his determined resistance and immunity to pain.

"During the restraint process, the subject will often be grunting and making animal-like noises."

The biggest problem may come after he is controlled - when, after struggling against restraint, there may come "a period of sudden tranquility." At this point, Lawrence says, "the officers realize the subject has stopped breathing. Invariably resuscitation efforts fail."

At autopsy, "the pathologist is typically unable to determine the exact cause of death," but the police, of course, generally end up being blamed.

ED episodes most likely occur between Thursday and Sunday, with Sunday the most common day, Lawrence has found. The hot months, May through September, are the most common time of year. Male subjects in their early 30s are most frequently afflicted, with subjects under 20 or over 50 least likely; female ED subjects are "extremely rare." Of illegal substances potentially involved, cocaine is most common (more than half the cases). Alcohol is common, too. About one-third of the time, the subject will have a diagnosed mental illness, schizophrenia most likely.

During his 15 years as a street cop, Everett says he saw "all kinds of people with mental impairments," but he believes he encountered only one memorable subject exhibiting ED - a young man pounding furiously on a plate glass window, then jumping on the hood of a car, trying to gain entry to a bar on a Sunday night when it was closed.

The melee with officers that ensued was "the closest I ever got to an unarmed life-and-death confrontation," Everett recalls.

The difference between that subject and the multitude of other EDPs he encountered in his career he likens to, "the difference between a Tyrannosaurus and a tabby cat. There's no subtlety about the intensity of energy, the physicality. It doesn't seem like you're dealing with anything human."

Seemingly invulnerable physically, the subject, in fact, may be experiencing a cluster of life-threatening physiological stresses, including hyperthermia, a change in blood acidity, electrolyte imbalances, a breakdown of muscle cells, and a leaching of cellular contents into the blood stream, all of which put his heart at significant risk.

With more research desperately needed, identifying "definitive, scientifically validated 'best practices'" for dealing with dangerous and difficult ED subjects may be impossible at present, Everett concedes. But based on his review of available data, he believes that "the overarching operational objective" when these individuals are confronted must be to bring them under control in a manner that does not unnecessarily aggravate their affliction and to get them immediate medical treatment.

Everett adds that ED is rare and that agencies may have other more prominent life and safety concerns to deal with. Based on what is known about ED now, he makes these recommendations:

1. Coordinate in advance with EMS. "ED is a medical emergency that presents itself as a law enforcement problem." Police and medical communities should strive to develop a coordinated approach for dealing with these incidents, with everyone involved understanding "what ED is and what their roles are" when dealing with an episode.
2. If feasible, train dispatchers to recognize and question for indicators of ED so that responding officers can be cautioned before reaching the scene. When ED is suspected, EMS personnel and any available crisis intervention teams should be promptly notified.
3. Where ED seems probable, EMS should be dispatched and stand by at a safe distance until the individual is restrained. "EMS involvement is warranted as early as possible."
4. "Unless there is an immediate public safety threat, the first responding officers should focus on containing the subject" in an environment that offers him maximum possible safety and protects others as well. Unless there are compelling reasons to do otherwise, officers should not approach the individual until substantial backup and medical personnel are on the scene.
5. As soon as the first responding officers believe they are dealing with ED, "they should ensure that SEVERAL officers are sent as backup." If physical restraint becomes necessary, they'll be needed for the protection of everyone involved. "Backing off until help is there makes sense and rushing to intervene alone, unless there is a compelling public safety threat, is foolhardy."
6. Once sufficient numbers are on hand, including medical personnel, then "police efforts should be focused on getting the subject under control as quickly and safely as possible." He needs medical treatment, but there can be no treatment until he has been brought under control.
7. In considering tactics, keep in mind that "ED is often characterized by superhuman strength and imperviousness to pain. Thus, control through empty-hand, mechanical techniques may be more difficult to achieve, and pain-based techniques may be relatively ineffective." The subject is typically "unresponsive to verbal direction."

The effectiveness of pepper spray and impact techniques (baton strikes and beanbag rounds) "will likely be diminished with individuals who are unresponsive to pain." If empty-hand techniques are to be tried, "then the officers should be trained in advance to function as part of a multiple-officer takedown team."

A better choice may be Conducted Energy Devices (Tasers). However, current research cautions about a possible link "between MULTIPLE such applications and death in persons with symptoms of ED. To mitigate this risk, a SINGLE Taser application should be made before the subject has been exhausted."

(The Taser should be used not in the hope of gaining compliance but to create a window of disablement during which officers can establish physical control of the subject.)

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One Taser firing in the probe mode, "followed by a restraint technique that does not impair respiration, may provide the optimum outcome." NOTE: "The Taser should not be used in the pain-distracted (push/stun) mode in dealing with ED individuals," since that is primarily a pain-reliant technique.

Whatever the tactical approach, "without a common plan and without training and practice in working together in multi-officer techniques, officers may very likely end up working against each other."

8. Adjust your restraint tactics. "People are designed to fight what is in front of them, and officers are almost universally trained to place individuals into a prone position because of safety and control advantages. This position may make it more difficult for the person to breathe, and this concern is heightened when dealing with ED."

Therefore, once control is achieved, "the subject should be placed on his side if this can be done without creating an unreasonable risk to officers or others. As soon as he is controlled, hand him off to the medics."

9. The goal is to get the subject into the hands of Advanced Life Support personnel or into a hospital as quickly as possible. Ideally, do not transport ED subjects in a police car. "They should be transported to a hospital in an ambulance," unless waiting for an ambulance would cause unreasonable delay. Officers should train in advance with EMS on how these individuals should best be placed on and secured to a stretcher.
10. Medical personnel should have protocols for dealing with ED cases, including the possibility of considering the prompt use of "chemical restraint" (powerful tranquilizing agents) to bring them down from their state of extreme agitation and violence. "At the very least, medical personnel are better equipped to intervene than police officers would be if there is a cardiac event."

Lawrence characterizes Everett's recommendations as "a forward-thinking attempt to advance our understanding and response" to ED. But he stresses that there are still many mysteries about this syndrome and that these suggestions should not all be regarded as guaranteed lifesavers.

For example, delaying physical control attempts until more officers and medical personnel are on hand may, in fact, permit a subject's condition to worsen, although Lawrence agrees that waiting will likely be more prudent from an officer-safety standpoint.

Similarly, rolling a subject onto his side after he is controlled in the prone position will not necessarily prevent his dying, "since we don't really know what is killing these people," Lawrence says.

However, he agrees with relieving pressure on the subject's respiratory system in that manner, provided that his legs are securely restrained to prevent him from kicking officers. Also, he reminds, the subject needs constant monitoring after being "controlled," given the ability of many suspects to defeat seemingly secure behind-the-back handcuffing.

(Although some medical critics of police tactics object to using the prone position to gain control because of its potential restriction on breathing, Lawrence says he has never found a critic who could suggest an effective alternative. Even the premise that prone positioning is related to ED deaths continues to be debated.)

Also, Lawrence points out, in remote locations where distance and lack of ready availability may delay the arrival of paramedics, it may be safer to quickly transport an ED subject by squad car to a hospital than to wait at the scene for an ambulance and field medical personnel. "Officers need to assess the circumstances and do what they think is most appropriate," he advises.

Everett agrees that his recommendations should be considered only "starting points" and that officers, trainers and agencies are "well advised to continue monitoring ED research for further developments and insights.

"As more research is done, the best practices will become clearer, and over time these will become the basis against which the profession is measured. Agencies that don't keep their training current will inevitably be compared with those that do when there's a lawsuit."

To assist in understanding and preparing for ED intervention, you may want to view a video training program developed by the Las Vegas Metro P.D. and posted on the Internet at http://www.southernnevadahealthdistrict.org/ems/ems_excited_delirium.htm.

This presentation includes vivid recreations of ED encounters, plus a post-training test.

Also a comprehensive report on ED, prepared by Sgt. Darren Laur of the Victoria (BC) P.D., is available through the Canadian Police Research Centre at:

http://www.cprc.org/tr/tr-2005-02_e.pdf

Chris Lawrence has published an article on the proper protocol for investigating sudden in-custody deaths, available from the archives of The Police Chief magazine at:

http://policechiefmagazine.org/magazine/index.cfm?fuseaction=display_arch&article_id=191&issue_id=12004

FSN readers can contact Lawrence directly at elginski@execulink.com for a copy of a form he has designed to guide such investigations. He is currently designing another form which will aid first responders in capturing "transient evidence" of ED episodes at the scene. This is expected to be published and posted by the Canadian Police Research Centre by the end of this month [10/05].

The CPRC also features a significant section on ED in a report of a year-old study of Taser use. This report can be viewed at www.cprc.org/tr/tr-2005-01.pdf

An information bulletin called "Law Enforcement Responses to Excited Delirium," which contains Everett's recommendations and background on the ED phenomenon, is scheduled to be accessible: www.lmnc.org by the end of the week of October 10.

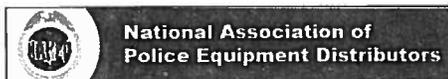
"Sudden Deaths in Custody," a book that deals with ED, is scheduled to be published next January ['06] by Humana Press. Authors are Darrell Ross of East Carolina University and Ted Chan of the University of California-San Diego.

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About the author

The FSRC was launched in 2004 by Executive Director Bill Lewinski, PhD. - a specialist in police psychology -- to conduct unique lethal-force experiments. The non-profit FSRC, based at Minnesota State University-Mankato, uses sophisticated time-and-motion measurements to document for the first time-critical hidden truths about the physical and mental dynamics of life-threatening events, particularly officer-involved shootings. Its startling findings profoundly impact on officer training and safety and on the public's naive perceptions.

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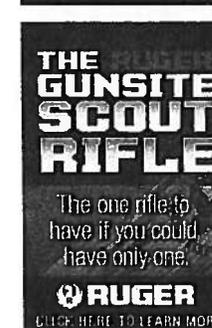
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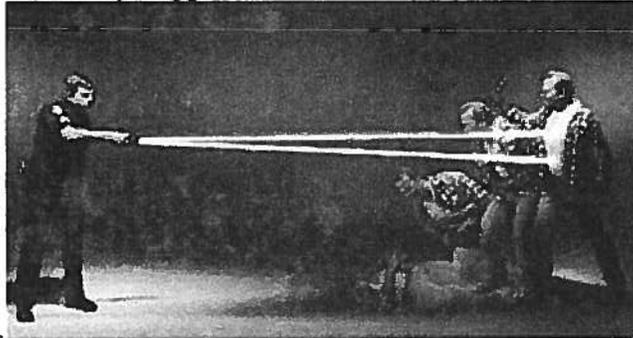


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Does 'Excited Delirium' Kill Taser Victims?

By [David Hambling](#)  August 12, 2009 | 5:35 pm | Categories: [Bizarro](#), [Less-lethal](#)

Even when supposedly “non-lethal” weapons are used to subdue a suspect, people can still die. Many blame the weapons used; Amnesty International report that at least 334 people have died in the USA after being Tasered. But a new study suggests that a condition known as Excited Delirium may be



responsible in many cases.

The University of Miami's official website on the condition says that the condition, which are frequently associated with drug abuse, include “bizarre and/or aggressive behavior, shouting, paranoia, panic, violence towards other people, unexpected physical strength, and hyperthermia.” These symptoms are often noted in suspects who are subdued apparently without harm, either by physical force, pepper spray or Taser, but who die shortly afterwards.”

The condition has always been hugely controversial since it was described in 1985. It is not recognized by the American Medical Association, and some critics, like the Excited Delirium blog, regard it as a “flimsy excuse” used to cover up police brutality.

Police psychologist Mike Webster, testifying on Taser deaths, said that excited delirium was a “dubious disorder” used by Taser International in its training of police. Certainly a page on the company's website suggests that excited delirium suggests it is the real cause of deaths blamed on Tasers by “certain anti-police groups.”

A 2005 book Excited Delirium Syndrome: Cause of Death and Prevention cast doubt on the traditional explanations on how such deaths occur (such as asphyxia) and argued that it was a form of sudden cardiac arrest brought on by stressors, but this had remained controversial.

The new study, carried out by Deborah Mash and colleagues at the University of Miami in Florida, is published in Forensic Science International (abstract only without subscription) and reported in New Scientist. The researchers looked at samples of brain tissue for ninety individuals who has apparently died of excited delirium.

They found the signatures of two distinctive “biomarker” proteins which were common to all ninety cases. One the one hand there were abnormally low levels of a dopamine transporter. This is a substance that would normally clear up excess dopamine produce by stress or drugs; a low level

means that the body could be overwhelmed by dopamine, leading to either cardiac problems or severe overheating.

A second biomarker is a "heat shock" protein called HSPA1B which is an indicator that body temperature was raised. This is not surprising, as the average core body temperature was 40.4 C, but it does give a forensic way of demonstrating that a person was overheating at the time of death.

So, if the research stands up, excited delirium is a real condition. But that doesn't necessarily mean that the weapons are not a factor. The RCMP have adopted a policy which acknowledges that there is a risk of death when using Tasers on "acutely agitated" suspects and restricts their use to cases where there is a threat to officers or the public. If the excited delirium is aggravated by a struggle with the police, then clearly their actions are a factor. And in any case there is clearly a need to supervise victims rather than leaving them unattended in a police cell or vehicle where they may die.

The new study is unlikely to settle the matter, but perhaps it will prompt more research into the question of exactly how you should treat someone with excited delirium to minimize the risk of harm to them without endangering anyone else.

Photo: Taser International

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Tasers Implicated in Excited Delirium Deaths

by LAURA SULLIVAN

This is the second of two reports on excited delirium.



Google Video

A still from a video shot by police shows efforts to revive Frederick Williams at the Gwinnett County Detention Center in a suburb of Atlanta in May 2004. Williams stopped breathing shortly after being stunned with a Taser; he died a few hours later. His family is suing the county and Taser International; the company has made it clear that it plans to argue Williams died of excited delirium.

Hear Part 1 of This Report

Death by Excited Delirium:
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Feb. 26, 2007

Recent Cases

Below are some recent instances in which excited delirium was cited to explain the deaths of people in police custody. In each case, the deceased had also been stunned with a Taser:

June 13, 2005 – Shawn C. Pirolozzi, 30, of Canton, Ohio, dies after police tried to subdue him with a Taser. His death certificate listed excited delirium as the cause of death. The

February 27, 2007

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The medical diagnosis called excited delirium is the subject of intense debate among doctors, law-enforcement officers and civil libertarians. They don't even all agree on whether the condition exists. But to Senior Cpl. Herb Cotner of the Dallas Police Department, there's no question that it's real.

"This is when you have someone doing push-ups with two 150-pound officers on their back," Cotner says, describing how the condition can manifest itself.

Excited delirium is a term more medical examiners are using to explain why people — often high on drugs or alcohol — die suddenly while in police custody.

Symptoms are said to include extreme agitation, aggressive, violent behavior and incoherence.

Cotner had to subdue several men. One man smashed through a plate-glass window, fell from a fence, broke his leg several times and still walked two blocks to fight with police.

"[I] had a guy that was handicapped, with a bad leg and a bad arm," Cotner said about another man. "[He] dragged us across a parking lot, and we had him half-controlled."

"These fights leave us exhausted," he adds. "There is no one thing that simply describes this. It's a totality of characteristics that you can't explain."

One minute, a person is fighting and screaming; the next minute, he's dead, Cotner says.

Taser was not listed as a contributing factor.

April 21, 2006 — Alvin Itula, 35, dies after a struggle with Salt Lake City police. Itula led officers on a foot chase, then fought with them when the officers caught up, according to police. Officers tased Itula and also used pepper spray and a baton. Itula stopped breathing soon after. The medical examiner found that Itula died of excited delirium brought on by methamphetamine and cocaine.

April 24, 2006 — Jose Romero, 23, dies in Dallas police custody. He was in his underwear, screaming and holding a knife on his neighbor's porch. Police tased him multiple times. He died shortly thereafter. The Dallas County medical examiner ruled Romero died of excited delirium.

Sept. 5, 2006 — Larry Noles, 52, dies in Louisville, Ky., after a struggle with police. Noles, an ex-Marine, was standing naked in the middle of a street when police were called. Police said he was agitated. They tased him two or three times. He died a few minutes later. The Jefferson County medical examiner ruled Noles died because of excited delirium and not the Taser.

Oct. 29, 2006 — Roger Holyfield, 17, dies after police in Jerseyville, Ill., shocked him twice with a Taser. Holyfield had been walking down a street, holding a phone in one hand and a Bible in the other, yelling that he wanted Jesus. After police shot him with the stun gun, Holyfield

Cotner trains officers to give the person space and try to calm them — unless the person poses a danger to someone else. In those cases, a fight often results.

And in a growing number of cases, police officers end up reaching for their Tasers. That is where the debate over excited delirium becomes more complicated.

Medical Condition or Legal Cover?

Civil-liberties groups fear that the diagnosis is being used to cover up police abuse — and to protect companies like Taser International from lawsuits.

Taser International, the company that makes stun guns, says its product helps police deal with people suspected of having excited delirium. A company spokesman told NPR that Tasers could be the only way to subdue a person fast enough to get medical attention.

But according to civil-liberties groups and legal filings, Taser may have financial reasons to support — and even encourage — the use of the excited delirium diagnosis.

Take the case of Frederick Williams. On a grainy video, Williams is screaming, "Don't kill me! I have a family to support. I've calmed down!" as several officers carry him into the Gwinnett County Detention Center in a suburb of Atlanta. One officer takes out his Taser and fires it directly onto Williams' chest.

The officer yells, "Relax! Stop resisting!" But the shock keeps jerking Williams' chest upward. As several officers hold Williams down, he is stunned six more times. A few minutes later, the officers realize Williams is not breathing. Williams died a few hours later.

Williams' family is now suing the county and Taser International. The company has made it clear in proceedings so far that it intends to argue Williams died of excited delirium — not because

went into a coma; he died the following day. A medical examiner ruled the death was probably a result of excited delirium.

Dec. 17, 2006 — Terill Enard, 29, dies following a disturbance at a Waffle house in Lafayette, La. He was naked and yelling, with a broken leg bone piercing his skin. Police stunned Enard with a Taser; he died several hours later. Police said the forensic report from the Lafayette Parish coroner's office found Enard died as a result of "cocaine-induced excited delirium."

— *Laura Sullivan*

of the Taser or excessive force. The medical examiner could not determine the exact cause of death.

Williams, a deacon in his church and father of four, had no drugs or alcohol in his system.

Publicizing the Diagnosis

Excited delirium has helped Taser International in the past. In recent years, the company has successfully defended itself against at least eight lawsuits involving people who died in police custody, arguing that the cause of death was excited delirium, not the Taser.

Taser International spokesman Steve Tuttle acknowledges that each year, his company sends hundreds of pamphlets to medical examiners explaining how to detect excited delirium. Taser also holds seminars across the country, which hundreds of law-enforcement officials attend. But Tuttle says his company is only providing information that has been vetted by researchers.

"We're not telling departments [that] excited delirium is always the cause of death following a Taser application," Tuttle said. "We're simply pointing out the facts: that excited delirium is an issue out there, and they need to treat this as a medical emergency if they see these signs."

Taser is also reaching out to the medical community.

John Peters is president of the Institute for the Prevention of In-Custody Deaths, a prominent consulting company in Henderson, Nev. His firm specializes in training law-enforcement officers, coroners, emergency-room physicians and others in the medical community about sudden death from excited delirium.

A Conflict of Interest?

Peters is also one of Taser International's star witnesses against claims that the weapon kills people. He and his staff were paid by Taser for a year and a half to instruct at the company's training academy.

Peters says that training law enforcement to embrace excited delirium does not affect his impartiality on the stand.

"Some people would say, 'Well, obviously you're on their side,'" Peters said. "But the Taser is just one piece of this. I'm not a Taser instructor. I don't hold stock in Taser. So we try to maintain a distance or separation."

But Eric Balaban, a staff attorney with the American Civil Liberties Union, worries that the messages police receive about excited delirium may actually exacerbate confrontations with people in custody.

"If police officers are being trained about this condition known as excited delirium, and are being told the people suffering from it have superhuman strength, and [these people] are being treated as if they are somehow not human, it can lead officers to escalate situations," he said.

Balaban says the fear is not just that excited delirium may not exist, but that it is already being overused — in lawsuits and on the streets.

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the windows of the vehicle. The police subsequently restrained his ankles and attached the ankle restraints and handcuffs together. He was then transported to a local hospital. While en route, the police officers noted he became tranquil (about 45 minutes after the onset of the disturbance). Upon arrival at the hospital a few minutes later, the subject was discovered to be in a respiratory arrest. Resuscitative attempts were futile. A postmortem examination was performed 1 hour and 45 minutes later (about 3 hours after the onset of the disturbance), and a rectal temperature of 41°C (106°F) was recorded. He had needle marks typical of intravenous drug abuse and pulmonary and cerebral edema. Abrasions and contusions of the ankles and wrists were also evident from his struggling against the restraints. Toxicologic analysis of postmortem blood disclosed 52.3 mg/L of lidocaine and 0.8 mg/L of cocaine. No lidocaine was administered to the victim during resuscitative attempts.

1.12.2.12.2 Neurochemistry of excited delirium. The cellular and molecular changes resulting in this stereotyped set of symptoms are now reasonably well understood. Using ligand binding and autoradiographic methods, researchers have identified a series of neurochemical abnormalities in the brains of excited delirium victims, as well as the interactions between the mesolimbic areas of the brain, where dopamine is the principle neurotransmitter, and endogenous opioids (Mash and Staley, 1999). The abnormalities have to do with the number and type of dopamine receptors, the number of sites where cocaine can bind with brain tissue, and the ability of cocaine and dopamine to interact with κ -type opiate receptors located primarily in the amygdala, but also in the nucleus accumbens and other corticolimbic zones.

Dopamine receptors were initially classified into two main groups, but with advances in molecular biology, these main groups have been further subdivided into five different recognizable subtypes of receptors, although for practical purposes they are still considered as two groups: the "D1-like receptors" (dopamine receptors D1 and D5), and the "D2-like receptors" (dopamine receptors D2, D3, and D4) (Seeman and Van Tol, 1994). The situation is somewhat confusing, largely because of the nomenclature used to describe dopamine receptors. Most antipsychotic drugs block the D2 receptors in direct correlation to their clinical potency, except clozapine, which preferentially binds the D4 receptor. D1 and D2 receptors can interact with each other and enhance the actions of each other, possibly through subunits of G proteins. In schizophrenia, D2 and D3 receptor density is elevated by 10% while the D4 receptor density is elevated by 600%. It has been suggested that cocaine craving may be the result of marked D3 receptor elevation over the limbic sectors of the striatum (Strange, 1998; Mash and Staley, 1999).

Cocaine use alters the number of brain D1, D2, and D3 dopamine receptors (Seeman and Van Tol, 1994; Staley et al., 1994; Mash and Staley, 1999). When compared to the brains of drug-free trauma victims, the cocaine recognition sites on the striatal dopamine transporter are elevated in the brains of most cocaine users (i.e., the nonpsychotic ones). No such increase is seen in patients with excited delirium. The fact that psychotic cocaine users fail to demonstrate this compensatory increase means that they cannot clear excess dopamine from their synapses. At the same time, chronic cocaine abuse leads to striatal decreases in the density of the D1 receptor subtype throughout the striatal reward centers, probably as a result of receptor downregulation (Staley and Mash, 1996). This type of downregulation is not seen in excited delirium.

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The fact that cocaine users quickly become tolerant to the euphoriant effects of the drug is probably explained by the change in the number of dopamine binding sites. D2 receptors in nonpsychotic cocaine abusers are unchanged. However, in the psychotic subgroup, marked reductions in the number of D2 receptors in the hypothalamus have been observed. Because these receptors are known to mediate temperature control, decreased numbers of D2 receptors may explain the occurrence of malignant hyperthermia in the psychotic patients. With fewer D2 receptors available, D1-mediated temperature increases would be unopposed (Staley et al., 1994). Obviously, the occurrence of hyperthermia, and its severity, depend on the absolute decrease in D2 receptors; if it is not very great, then hyperthermia may or may not occur.

The significance of changes in the D3 receptor has only recently become apparent (Mash and Staley, 1999). Compared to drug-free controls, the brains of nonpsychotic cocaine users contain an increased number of D3 binding sites, with a one- to threefold increase measurable in the nucleus accumbens and in the ventromedial sectors of the caudate and putamen. Nucleus accumbens is a collection of brainstem neurons deeply implicated in the process of addiction to all drugs. Within this nucleus, cocaine exposure also causes increased production of D3 receptor mRNA.

By mechanisms yet to be determined, the increase in D3 receptors is in some way related to an increase in the number of κ -opioid receptors. Nonpsychotic cocaine users, when compared to drug-free controls, have twice the number of κ receptors in the nucleus accumbens and other corticolimbic areas. Unlike the nonpsychotic cocaine users, cocaine users who die of excited delirium have a selective upregulation of κ receptors in the amygdala (Staley et al., 1997; Mash and Staley, 1999). The observation almost certainly explains the paranoid nature of the psychotic episodes experienced by these patients. Although it would have been an unthinkable undertaking just a few years ago, PET scanning has been used to map the functional neuroanatomy of psychosis (Epstein et al., 1999).

The amygdala and other portions of the striatum play a very significant role in controlling our emotional response to external stimuli. Studies of schizophrenic patients, with or without hallucinations and paranoid delusions, have shown marked increases in mesolimbic activity, particularly when there is a perceived threat (Goodwin, 1996; Fudge et al., 1998). Of particular interest is the observation that, in drug-free patients with schizophrenia, projections from the amygdala to the frontal area of the brain may be involved. Decreased frontal lobe blood flow and glucose uptake are known concomitants of chronic cocaine abuse (Volkow et al., 1993).

Some of the neurochemical effects of cocaine seem to be gender related. Studies utilizing proton magnetic resonance spectroscopy have shown that the brains of cocaine users, when compared to those of non-drug-using controls, contain decreased amounts of *N*-acetyl compounds, an indicator of neuronal damage. Production of myoinositol, an indicator of glial activation, is increased. Both of these alterations are most prominent in the frontal lobes, and both changes are much more pronounced in men than in women. Whether these neurochemical alterations explain why nearly all excited delirium victims are men is not known (Chang et al., 1999).

As Bell first observed in the 1840s, excited delirium can occur in conjunction with many different medical disorders, not just cocaine or stimulant toxicity. It has been suggested that this constellation of symptoms is actually a variant of neuroleptic malignant syndrome (Kosten and Kleber, 1987, 1988). Neuroleptic malignant syndrome (NMS) is a highly lethal disorder seen in patients taking dopamine antagonists and in individuals who have been withdrawn from dopaminergic agents, such as bromocriptine and levodopa (Friedman et

al., 1985; Levinson, 1985). NMS is usually associated with muscle rigidity, though variants of the syndrome without rigidity are also recognized. Whether the same set of abnormalities underlie both excited delirium and NMS is unclear, but given that schizophrenic patients and patients suffering from bipolar disorder can also develop excited delirium, even when they are not taking dopaminergic agents, it seems likely that two different processes are at work (O'Halloran and Lewman, 1993).

1.12.2.12.3 *Medico-legal considerations.* Not uncommonly, patients with excited delirium find themselves "hog-tied," with their wrists and ankles bound together behind their backs while they lie prone (Reay et al., 1988, 1992; O'Halloran and Lewman, 1993; Reay, 1993; Pollanen et al., 1998; O'Halloran and Frank, 2000). Based on some early studies and anecdotal case reports, the cause for death in these individuals was said to be an entity called "positional asphyxia," a term originally used to describe what happens when alcoholics or otherwise infirm individuals fall into a confined space and are unaware that their respiratory status has been compromised and that their chests are not expanding adequately (DiMaio and DiMaio, 1989; Purdue, 2000).

In all such cases, autopsy will disclose marked congestion, cyanosis, and petechiae. However, the term is now applied to agitated psychotics, transported prone, who die suddenly, and in whom autopsy is said to be unrevealing (Reay et al., 1992). Or, as a 1995 publication from the U.S. Department of Justice puts it, "positional asphyxia" occurs as "a result of a body position that interferes with one's ability to breathe — as it occurs within a confrontational situation involving law enforcement officers" (Petty and McDonough, 1995). This same report goes on to state that such deaths are more likely to occur when there is either "cocaine-induced bizarre or frenzied behavior ... or drugs and alcohol intoxication" or a "violent struggle extreme enough to require the officers to employ some type of restraint technique."

There is no question that intoxicated, massively obese individuals trapped in confined spaces may not be able to expand their own chests, and the term "positional asphyxia" is appropriately used in such cases. But, this new definition, as defined by the Justice Department, was formulated before the neurochemical changes in excited delirium had been characterized (Staley et al., 1994, 1997; Mash and Staley, 1999), before it was apparent that stimulant abusers have enlarged hearts (Karch et al., 1995), before it was widely recognized by pathologists that myocardial hypertrophy was an independent and potent risk predictor for sudden cardiac death (Frohlich, 1999; Zipes and Wellens, 1998), and before it was demonstrated that "hog-tying," at least of normal-sized individuals (body mass index [BMI] < 30), has no significant effect on respiratory function (Chan et al., 1997, 1998; Schmidt and Snowden, 1999; Elfawal, 2000), at least not those with normal hearts.

Failure to recognize these anatomic and histochemical changes, coupled with incomplete autopsies (no heart weights or heart weight not normalized) and minimal scene investigation, has led to a flood of litigation (Table 1.12.2.12.3.1). Much of the confusion stems from the failure of those involved to properly document what occurred. For example, paramedics, and even medical examiners, more often than not fail to record a victim's temperature, either at the scene or at the time of postmortem examination. If the temperature has not been recorded, proving that a decedent suffered from excited delirium becomes that much more difficult. Similarly, unless strangulation is specifically ruled out at autopsy, considerable liability may result. Meticulous neck dissection is required, and the findings need to be documented photographically. Efforts made during prehospital care require equally precise documentation. Attempts at endotracheal intubation and cardiopulmonary resuscitation may produce petechiae, contusion, and even damage to

Table 1.12.2.12.3.1 Protocol for Excited (Agitated) Delirium Deaths

1. *Training:* Establish protocols that:
 - Do not use pepper spray when excited delirium is suspected. It will not subdue the individual, and will only create needless liability.
 - Do not hog-tie the victim. If the heart is abnormal, doing so may hasten death.
 - Make every effort to transport the patient by ambulance, not police car.
 - Never transport an excited delirium patient unattended in a police van.
 - Always take excited delirium victims to a hospital, never to a jail.
 - Notify the medical examiner immediately of any excited-delirium-like death.
 - Document that each officer has learned the protocol.
2. *Neurochemical testing:* Make arrangements with a local university or medical school to process the brain. The University of Miami brain endowment bank has done extensive research in this area and can always be consulted (1-800-UMBRAIN).
3. *Temperature:* Take and record the core temperature of the deceased at the scene. Take and record the ambient air temperature.
4. Interview all witnesses; verify the method of restraint and time to loss of consciousness.
5. If the deceased was transported by ambulance, review paramedic records for temperature and oxygen-saturation measurements.
6. If pepper spray was used, confiscate the unit and weigh it to estimate the amount remaining (as an indication of how much was used).
7. Autopsy protocol to be completed within 24 hours of death:
 - a. Remove brain, place 1-cm slices on baking sheet, rinse with saline, freeze with dry ice, and ship to neurochemistry reference lab.
 - b. Remove heart and fix prior to examination. Consider consultation with a university-based cardiac pathologist.
 - c. Obtain urine, blood samples from right heart, and also brain tissue for toxicologic testing; record sites of sampling
8. Always remove the brain and thoracic organs *before* performing and photographing the neck dissection (prevents artifacts simulating neck trauma).
9. Consider asking family of decedent to designate a forensic pathologist to be present at time of autopsy.

the tracheal mucosa and strap muscles of the neck (Raven et al., 1999). Any one of these artifactual changes could mistakenly be attributed to the effects of neck compression or choke hold. If the resuscitative attempts go undocumented, false accusations of brutality may result.

The presence of petechiae is often cited as proof of death from "positional asphyxia" (Reay et al., 1992), but petechiae around the eyes are not infrequently seen in individuals with heart failure, for whom there is no question of drug abuse or strangulation having occurred (Rao and Wetli, 1988). Petechiae can, and do, occur as a result of resuscitative attempts (Maxeiner and Winklhofer, 1999; Raven et al., 1999), and they may not be apparent until some time has elapsed after death (Kondo et al., 1997; Burke et al., 1998). That being the case, photographic documentation of the absence of petechiae is just as important as documentation of their presence.

The mean cocaine concentration in 45 cases seen by the Miami-Dade County Medical Examiner was 1.32 mg/L (range .05–11.8 mg/L, $n = 34$), while the benzoylecgonine level was 3.78 mg/L (range .08–14.75 mg/L, $n = 38$). In these same deceased individuals, the mean brain cocaine concentration was 1.90 mg/kg (range .05–4 mg/kg, $n = 10$), while the mean benzoylecgonine concentration was 2.69 mg/kg (range .85–3.5 mg/kg, $n = 6$) (Wetli et al., 1996). By comparison, cocaine blood concentrations in a group of 51 trauma victims, where the presence of cocaine was an incidental finding, were not much lower than in victims of excited delirium (Karch et al., 1998).

Questions as to whether the death of these individuals is centrally mediated or a consequence of unrecognized heart disease, and whether either possibility is increased by the process of restraint remain unanswered. In experimental animals, the stress of restraint makes fatal outcomes more likely. Rats injected daily with moderate doses of cocaine (30 mg/kg) and then restrained are three times more likely to die from seizures than rats injected with the same amount of drug and allowed free access to their cages (Pudiak and Bozarth, 1994). However, because seizure activity in actual patients with this syndrome is extremely rare, the relevance of this experimental model is doubtful. It has also been suggested that the mechanism of death may involve a surge of catecholamines released by the stress response, acting upon a myocardium already sensitized by cocaine (Mirchandani et al., 1994).

This last explanation seems to be increasingly probable. As discussed in Section 1.12.2.6, myocardial hypertrophy, even in individuals who are not drug users, is associated with structural changes that increase the risk for arrhythmia and sudden death. Some of these structural changes are clearly related to catecholamine toxicity, while others are the result of myocardial hypertrophy, which can almost always be detected in chronic cocaine users (but only if the heart is weighed and compared to the standard nomogram). Surges in catecholamines produce myocyte damage (contraction band necrosis and damage to vessel walls) and, at the same time, lower the threshold for ventricular fibrillation. The microvasculature changes seen in the hearts of excited delirium patients are highly reminiscent of those seen in hypertensive individuals — a decrease in the lumen of arteriole, as a direct consequence of either vasoconstriction or wall thickening (O'Halloran and Lewman, 1993; Gavin et al., 1998), and these changes also favor ischemia, which lowers the fibrillatory threshold.

Whatever the cause, the syndrome is occurring with some regularity. And, because violent behavior is part of the syndrome, the police are almost inevitably involved, which means that patients with this disease often die in police custody or en route to the hospital (Mirchandani et al., 1994). In some jurisdictions, "Tasers" are used to subdue the violently agitated. This device produces an electrical charge sufficient to produce immobilization. Virtually all fatalities associated with "Taser" use have been patients with excited delirium (Kornblum and Reddy, 1991). It may be that the device activates a stress response similar to being "hog-tied." On the other hand, death and use of the "Taser" could have been purely coincidental.

Similar considerations apply to the pepper sprays used by some police departments. All of the adult deaths associated with pepper spray use have been in individuals with excited delirium, usually in cocaine users. In the absence of laryngeal edema, it is difficult to conceive of a mechanism, or any connection at all, other than that violently psychotic individuals are more likely to be exposed to pepper spray than people who are not psychotic. However, because of low cocaine blood levels at autopsy, because of general misunderstandings about cocaine blood concentrations and the probability of death, because of core temperatures generally not being taken, because of heart weights not being normalized, and because hearts are not examined microscopically, it is hardly surprising

that death is often attributed to use of a choke hold or pepper spray or hog-tying. The other alternative, attributing death to a trivial head injury (minor cerebral contusions or subdural hematomas), is still another obvious temptation best avoided (Mirchandani et al., 1994).

In some cities in the U.S., medical examiners have taken the sensible approach of contacting the deceased's family and asking them to retain their own pathologist to witness the autopsy. In the U.K., this is standard practice. But even the presence of an independent observer may not be enough to prevent litigation or to prevent individuals from confusing temporal proximity of an action, such as hog-tying, with causality. Aristotle identified this type of logical error more than 2000 years ago. One would hope that, in the interim, pathologists would have learned to avoid this mistake and base their decisions on factual analysis, not flawed reasoning.

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May 27, 2011

DOJ releases controversial study on so-called 'stun guns'

The study released by NIJ concludes that it's appropriate for officers to use stun guns to subdue unruly or uncooperative suspects

By Dave Collins Associated Press

HARTFORD, Conn. — Police officers using stun guns should avoid shooting suspects multiple times or for prolonged periods to reduce the risk of potential injury or death, according to a new U.S. Justice Department study prompted by hundreds of police-involved deaths across the country.

Coroners and other medical experts on the study panel concluded that while the effects of prolonged and repeated stun gun use on the body are not fully understood, most deaths officially attributed to Tasers and similar devices are from multiple or lengthy discharges of the weapons.

The panel reviewed nearly 300 cases in which people died from 1999 to 2005 after police shot them with stun guns, but found that most of the deaths were caused by underlying health problems and other issues. Of those cases, the experts examined 22 in which the use of stun guns was listed as an official cause of death.

The study released Tuesday by the department's research arm, the National Institute of Justice, concludes that it's appropriate for officers to use stun guns to subdue unruly or uncooperative suspects, as long as police adhere to "accepted national guidelines and appropriate use-of-force policy." It also makes several recommendations, including medical screenings for all people shot with stun guns.

The experts also noted that evidence shows the risk of death from a stun gun related incident is less than 0.25 percent, and there's no conclusive evidence that stun guns cause permanent health problems.

"What this study suggests is, indeed, less-than-lethal technologies ... can be effectively used by law enforcement," said John Laub, director of the National Institute of Justice.

Justice Department officials said the study began more than six years ago after Amnesty International and other groups blamed many death of suspects in police custody on stun gun. Both Amnesty International and the United Nations Committee Against Torture have called the use of stuns guns a form of torture in some cases.

More than 12,000 law enforcement agencies nationwide had issued about 260,000 stun guns to officers as of spring of last year, the study said. Of the more than 600 arrest-related deaths in the U.S. each year, there are very few cases in which stun guns are cited the cause or contributory factor, the report said.

Officials at Taser International, the maker of the leading stun guns, said Thursday that there are no peer-reviewed medical studies that have found that prolonged or repeated use of Tasers cause death. In 2009, however, the company advised Taser users to try to avoid shooting people in the chest, because of a very low risk of a health problem.

Alvaro Garzon, a 46-year-old drug and alcohol addiction counselor from New Haven, said the study's cautions about firing stun guns multiple times make sense. Garzon has filed a brutality complaint with New Haven police saying a city officer shot him with a stun gun four times last year during a domestic disturbance call.

"After two times it should be enough," Garzon said in Spanish on Thursday while his daughter, Lina, interpreted for him. "You don't feel good after the second shot. I felt like I was burning inside."

Garzon, who was accepted into a probation program on a charge of assault on a police officer, said he was treated at a hospital for lung problems, and he continues to suffer from the trauma. The status of Garzon's police complaint wasn't immediately clear Thursday night.

Police across the country have faced heated criticism for stun gun deaths.

Connecticut state police are investigating the May 1 death of 26-year-old Marcus Brown, who authorities say was shot with a stun gun by Waterbury police while he was in the back of a police cruiser and handcuffed. Brown's family is calling for federal authorities to investigate; the official cause of death is still pending.

Waterbury police say Brown, who was about 5 feet 6 inches tall and 125 pounds, became combative. The officer who shot Brown, Adrian Sanchez, had been placed on administrative duty under normal procedures.

Earlier this month, Connecticut state police released an investigation report that showed how Middletown police last year shot 35-year-old Efrain Carrion 34 times with stun guns to subdue him while responding to a report that he was despondent and violent. Carrion died later that day.



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The medical examiner concluded Carrion died of "excited delirium," a cause of death not recognized by many medical groups but one the Justice Department says is well documented. Several officers were cleared of wrongdoing in the incident.

Last year, a jury in Louisiana acquitted former Winnfield officer Scott Nugent, who was accused of shooting handcuffed suspect Baron Pikes eight times with a Taser gun and charged with manslaughter. Pikes later died.

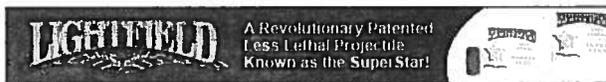
In 2006, police in Green Cove Springs, Fla., shot a 56-year-old woman in a wheelchair 10 times with a stun gun and she died. Police say Emily Marie Delafield was swinging knives and a hammer at relative and police, and officers had tried to talk her into dropping the weapons before they were forced to subdue her. The officers' actions were found to be justified.

Lt. J. Paul Vance, a spokesman for Connecticut state police, said police officers never want to get into a situation where they're forced to fire Tasers or other weapons.

"Certainly you're looking for voluntary compliance from a suspect ... but unfortunately that's not always achievable," Vance said.

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Posted by [fatman16@hotmail.com](#) on Saturday, May 28, 2011 09:11 AM Pacific [Report Abuse](#)

PD Why does anyone even listen to people like Amnesty International anymore? They complain no matter what we do, or what we don't do. And who is that moron counselor? He got arrested during a domestic, and didn't like that he had to be tased so many times. Then maybe he should have complied after the second ride on the taser, and he wouldn't have needed 4...

Posted by [lumpy193](#) on Saturday, May 28, 2011 07:02 AM Pacific [Report Abuse](#)

PD The Taser is a very effective tool; it drops me like a sack of potatoes. That said, although I continue to qualify with the Taser, I do not carry one. Our training staff asked me why and I gave the following politically incorrect answer: I spent a lot of time, energy and money learning how to effectively use my hands, elbows, knees, legs, feet, ASP and a wide variety of other implements of chaos. I advised I prefer to get my money's worth by utilizing the above when necessary. Before the comments start, I am not some arrogant fool who thinks I am indestructible. I simply prefer to rely on my own abilities to defend myself rather than an electronic device. Too many instances where Taser has failed stop a suspect and then the individual who deployed the Taser now does not know what to do because they have come to rely on the Taser too much.

Posted by [nathanhayes](#) on Saturday, May 28, 2011 05:40 AM Pacific [Report Abuse](#)

PD My department has a medical review check requirement (except for officers hit in training). I have carried a Taser for about a year now and haven't used it yet. One of the main reasons is the hospital visit. If someone is being combative they belong in jail, not the hospital.

Posted by [HRPufnstuf](#) on Saturday, May 28, 2011 04:43 AM Pacific [Report Abuse](#)

PD So the perp says that two time should be enough. I agree. If two zaps doesn't stop them, step back and "insert" a couple of .45 rounds into them. That should stop them.

Posted by [wmccarty](#) on Saturday, May 28, 2011 03:33 AM Pacific [Report Abuse](#)

Another pile of crap from the " Associated Depressed."



Posted by jjackson110@hotmail.com on Saturday, May 28, 2011 00:42 AM Pacific

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There is so much BS in this article it's ridiculous. I knew it was an AP article before I even looked.



Posted by [nichow](#) on Friday, May 27, 2011 08:52 PM Pacific

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I guess overall this study works in our favor by saying tazers are a good tool when "accepted national guidelines" are used. I have no idea what they are talking about "national guidelines" unless they are talking about case law on the use of force.



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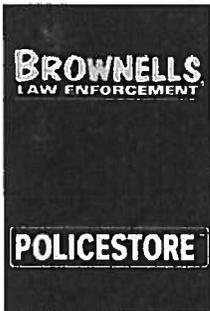
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Introduction



Over the past decade, increased attention has been paid to the sudden and seemingly inexplicable deaths of some highly agitated subjects being held in police custody. In most of these cases, the force required to restrain or incapacitate the suspect was not sufficient to cause death.

Our colleagues in Miami-Dade County, Florida, first described the syndrome of excited delirium associated with cocaine abuse. The symptoms of excited delirium include bizarre and/or aggressive behavior, shouting, paranoia, panic, violence towards other people, unexpected physical strength, and hyperthermia. Throughout the United States and Canada, these cases are frequently associated with psychostimulant abuse, representing the extreme end of a psychiatric continuum of drug abuse effects. However, reports of acute exhaustive mania, physical restraint, Pepper Spray or TASER and sudden death also have been reported that are not related to abused drugs, suggesting further that an underlying central nervous system disorder was the precipitating cause of lethality. Such victims of excited delirium have provoked allegations of police misconduct, unnecessary force and improper TASER deployment.

Medical examiners often have extreme difficulty in identifying the cause of death, but frequently drug intoxication is considered as a contributing factor or cause of death. While the precise cause and mechanism of these deaths remain controversial, we have demonstrated abnormalities in brain that define and confirm the occurrence of the excited delirium syndrome.

What to Know

Fact: ED is a medical emergency that presents itself as a law enforcement problem.
 - Early and advanced coordination with EMS is key.

Fact: ED is not easy to recognize.
 - Training is important so that dispatch or other personnel recognize behavioral signs.

Fact: ED containment requires backup personnel.
 - Do not approach until it is safe to do so and always ensure several officers are present.

Fact: ED victims exhibit superhuman strength and are impervious to pain.
 - Restraint positions and use of electronic control devices (TASER®) to override the CNS.

Fact: ED is a life-threatening emergency.
 - Get the subject into acute medical care quickly.

Headlines

[Death by Excited Delirium: Diagnosis or Coverup? full story...](#)

[Coroner Rules Cocaine, Not Taser, Killed Prisoner full story...](#)

[Detained man's 'drug delirium' full story ..](#)

[Top chef died after cocaine reaction full story ..](#)

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[Cocaine, Excited Delirium and Sudden Unexpected Death full story ..](#)



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Excited Delirium

The usual presentation in such deaths is that of individuals in **excited delirium**. They are confused, irrational, hyperactive, and usually violent. In an attempt to restrain them from injuring themselves or others, a violent struggle ensues. Immediately after the struggle ends, the individual abruptly becomes unresponsive, develops cardiopulmonary arrest, and does not respond to cardiopulmonary resuscitation. In cases involving the police, individuals usually become unresponsive after being handcuffed and placed or wrestled to the ground. In some instances, this occurs as they are being transported to jail or a hospital. At autopsy, there is no anatomical cause for the death, though minor injuries, e.g., abrasions, may be present. In the cases involving the police, toxicologic testing will usually reveal drugs such as cocaine or methamphetamine. It is the cocaine or another stimulant that is presumably causing the excited delirium. The authors would like to reiterate that the lapse into unresponsiveness and development of cardiopulmonary arrest almost invariably occurs after the struggle has ended.

Catecholamine Release

In cases such as the aforementioned, most deaths are caused by the combined effect of the physiological consequences of violent physical activity and the effects of the drugs. During high intensity exercise, e.g., a struggle, there is release of catecholamines (norepinephrine and epinephrine) from the adrenals into the circulation. The effects of these substances are to increase the rate and force of contraction of the heart, the conduction velocity and the blood pressure. This results in an increase in demand for oxygen by the heart. The highest levels of catecholamines occur not during physical activity (struggle in this case) but approximately 3 min after cessation of the activity.

Potassium

During the struggle, not only do the levels of the catecholamines increase in the blood but so do blood potassium concentrations.²⁻⁴ The increase may be as much as 5 mEq/l or more in some individuals.⁴ Following cessation of exercise, there is an immediate, rapid drop in blood potassium to concentrations that approach 2 mEq/l.³⁻⁵ Five minutes after cessation of the exercise, potassium levels may be lower than when they were at rest. There may be prolonged hypokalemia lasting 90 min or more.^{3,5} These extremes in potassium concentrations can have cardiac arrhythmogenic effects. The arrhythmogenic effects of the hyperkalemia, however, are neutralized by the cardioprotective effect of the elevated levels of catecholamines.⁶ Thus, the danger time for arrhythmias is immediately following cessation of physical activity, when blood catecholamine concentrations continue to rise while potassium levels

als in **excited delirium** usually violent. In an individual abruptly arrested, and does not involving the police, handcuffed and placed in a cell as they are being taken to the hospital. In the cases where drugs such as amphetamines are the stimulant that is involved, it would like to reiterate the danger time for cardiac arrhythmias during this period.¹

drop dramatically to hypokalemic levels. This period has been referred to by Dimsdale et al. as the time of **post-exercise peril**, in that there is a risk of cardiac arrhythmias during this period.¹

Effects of Catecholamines on the Heart

Upon commencement of high-intensity physical activity (a struggle in these cases), the adrenal glands secrete epinephrine and norepinephrine into the blood. Most of the alpha adrenergic receptors on effector organs (cardiac muscle, smooth muscle) are alpha-1 receptors. Stimulation results in smooth muscle contraction of blood vessels, with resultant vasospasm. The beta-1 receptors are primarily in the heart; the beta-2 receptors in the heart and peripherally. Stimulation of the beta-1 receptors causes an increase in heart rate, contractility and conduction velocity. Beta-2 stimulation results in smooth muscle relaxation. Epinephrine reacts with alpha and beta receptors both peripherally and in the cardiovascular system. Norepinephrine has its predominant effect on the cardiovascular system, reacting with the alpha-1 and beta-1 receptors in the effector cells of the heart. Thus, both epinephrine and norepinephrine react with beta-1 receptors with resultant increase in heart rate, contractility and conduction velocity. Coronary arteries have in their walls both beta-2 and alpha-1 receptors, with the beta-2 more plentiful. Norepinephrine interacting only with the alpha-1 receptors causes vasoconstriction, thus decreasing the amount of oxygenated blood being supplied to the myocardium by the coronary arteries. Therefore, any drug that causes increased exposure of receptor sites to norepinephrine predisposes to coronary artery constriction at the time the heart needs more — not less — oxygen. At the same time that changes in catecholamine concentrations are occurring, the aforementioned changes in blood potassium levels also occur.

Actions of Drugs

Following cessation of a violent struggle, the levels of catecholamine continue to increase for approximately three minutes, while the level of potassium drops dramatically.¹⁻⁵ These two factors predispose to the development of an arrhythmia. This is the time of "**post exercise peril**" described by Dimsdale.¹ Stimulants such as cocaine and methamphetamine can cause excited delirium. If the individual has taken amphetamine, cocaine or another stimulant, the physiologic effects of the struggle can be magnified by the drugs and a fatal arrhythmia more readily ensue. Cocaine has a double effect. It causes increased release of catecholamines from the adrenals and inhibits norepinephrine reuptake. The latter action causes norepinephrine to accumulate at the neuroeffector junction, intensifying its effect. Thus, by these actions, cocaine works on the beta-1 receptors to increase heart rate, force of contraction and

used by the combined physical activity and the adrenaline (epinephrine) from the adrenal glands. The chances are to increase conduction velocity and the oxygen by the heart. During physical activity (a struggle) the potassium levels of the activity.^{1,2}

Catecholamines increase in the blood. The increase may be following cessation of physical activity, potassium to concentration of the exercise, rest. There may be extremes in potassium levels. The arrhythmogenic danger time for physical activity, when potassium levels

conduction velocity, while, at the same time, acting on the alpha receptors in the coronary arteries to cause contraction, reducing myocardial perfusion. Thus, as the myocardium needs increasing amounts of oxygen, due to the stimulation of the beta-1 receptors, the amount of blood perfusing the myocardium is reduced by constriction of the coronary arteries. Amphetamine has the same effect as cocaine, but, instead of blocking the reuptake of norepinephrine, it causes release of norepinephrine from the sympathetic fibers.

Alcohol

Sudden death of an individual with a history of alcohol abuse and in whom only alcohol may be present also occurs during a struggle. Alcohol is a recognized cause of a variety of atrial and ventricular arrhythmias.⁷⁻⁹ In addition, chronic alcoholics have been found to have a prolonged QT interval, an affliction associated with sudden death, as well as increased levels of norepinephrine.¹⁰⁻¹² All these predispositions to arrhythmias can be aggravated by catecholamines released during a violent struggle. Thus, if the heart is predisposed to fatal arrhythmias by the action of alcohol, then, under conditions such as a violent struggle, the released catecholamines can produce a fatal arrhythmia.

Endogenous Mental Disease: Acute Psychotic Episodes

Excited delirium may also occur in the absence of stimulant drugs such as cocaine, methamphetamine or alcohol in individuals with endogenous mental disease. Clinically, these are usually referred to as acute psychotic episodes, and tend to occur in individuals with schizophrenia, schizoaffective disorders or delusional disorders. Acute psychotic episodes happen both in and out of mental facilities. They may occur because of the patient's discontinuance of medications or development of tolerance to the medications. If the episode occurs outside a mental health facility, the police are usually called on to deal with the individual; if inside the facility, it is nursing or support personnel. Sudden death can be caused by either the physiological effects of catecholamine and hypokalemia following the struggle or a combination of these effects and the effects of the medications the patient is or was on. Many patients, nowadays, are on medications, some of which have a cardiotoxic potential. The tricyclic antidepressants, just like cocaine, block reuptake of norepinephrine. The action of these drugs can predispose an individual to a cardiac arrhythmia.

Natural Disease without Anatomical Manifestations

In some instances, sudden death during or following a struggle can be caused by natural disease that is not diagnosable anatomically. In such instances, a

he alpha receptors in myocardial perfusion. f oxygen, due to the d perfusing the myo- teries. Amphetamine he reuptake of nore- e sympathetic fibers.

Most medical professionals, including forensic pathologists, have no experience with individuals who are in the throes of excited delirium. They do not comprehend the violence or the intensity of the struggle. Thus, to restrain a 12-yr-old child during an acute psychotic episode may take four large adults, one to each extremity, while a fifth administers a tranquilizing injection. Nursing articles recommend that, when attempting to physically restrain a violent individual experiencing an acute psychotic episode, at least six individuals be used.¹³

When someone dies during a struggle, the natural question is why. An explanation involving catecholamines, alpha and beta receptors, and potassium levels, is difficult for most people to understand. Choke holds and positional asphyxia can be demonstrated and are simple to understand, therefore, it is normal to gravitate to this simpler explanation for a death. Even if there is absolutely no evidence of use of a choke hold or positional asphyxia, and the law enforcement or medical personnel deny using either, the denials are sometimes dismissed as a cover-up. The concept of death caused by a choke hold is very popular because, when no evidence of trauma to the neck is found, this would seem to "prove" that the choke hold was "expertly" applied. Of course, use of a choke hold is just a form of manual strangulation. It always amazes me when a 200-lb adult male is allegedly killed with a choke hold without a mark on the throat and no petechiae in the eyes, while a 100-lb woman, manually strangled by an individual twice her weight, is able to put up sufficient struggle so as to have bruises on the neck and petechiae of the conjunctivae and sclerae. Since use of a choke hold is manual strangulation, the individual applying the choke hold must maintain it for close to 2 min to cause cessation of respiration.

Deaths Ascribed to Positional Asphyxia

For respiration, one has to have an open airway; lungs capable of gas exchange and the ability to ventilate the lungs. In deaths ascribed to positional asphyxia, it is alleged that there is interference with ventilation of the lungs. Ventilation involves movement of the chest wall, diaphragm and abdominal wall. Positional asphyxia occurs when an individual is placed in or somehow gets into a position where there is interference with his ventilatory efforts (Figure 8.12). A number of deaths occurring after episodes of manic delirium have been ascribed to positional asphyxia.

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Law enforcement personnel routinely employ physical restraints to control prisoners. The most common of these are handcuffs. When the prisoner is violent, there may be escalation to ankle shackles, restraint chairs, etc. Until the mid-1990s, use of "hogtie" restraints was common. In the hogtie position, the prisoner is placed face down on the ground, his wrists and ankles bound behind his back and then tied together by a rope or cord. This type of restraint began to fall in disuse when it was alleged that sudden death could be produced utilizing this position and type of restraint. Numerous civil suits were filed in regard to prisoners dying while hogtied. It was alleged that securing an individual in this position caused hypoventilatory respiratory failure, i.e., positional asphyxia. Studies by Chan et al. refuted these contentions.¹⁴ In experiments involving high-intensity physical activity followed by hogtie restraint, Chan et al. demonstrated that, while there was impairment in respiratory activity, it "did not result in clinically relevant changes in oxygenation or ventilation." Eisele et al. continued this line of research, with the addition of placing 25- and 50-lb weights between the shoulder blades while the subjects were prone and hogtied, to simulate an individual pressing down on the back of someone hogtied. The tests showed no significant effect on oxygen saturation of the blood.¹⁵

While virtually all deaths in manic delirium are probably caused by the physiological reactions to a violent struggle (with or without interaction with drugs), in occasional cases, positional asphyxia may play a role in a death. Thus, if individuals are placed in hogtie restraint and put in the back of a vehicle so that their abdomens lie over the transmission hump, a reasonable argument for positional asphyxia can be made. There is also the problem with massively obese individuals. There is a potential for positional asphyxia if a hogtie is applied and they are left face down. In both situations, pressure on the abdomen would impair the abdominal component of respiration as well as forcing the diaphragm up, reducing its capacity for excursion.

Certification of Death

In the aforementioned cases, the authors suggest two ways of certifying the cause of death. First is to sign out the cause of death as "excited delirium" and then list "struggle," "cocaine intoxication," etc., as contributory causes. The other way is to sign out the cause of death in a descriptive manner, e.g. "Cardiopulmonary arrest during violent struggle in individual under influence of cocaine, alcohol, etc." In individuals with psychoses, this is listed either as a contributory cause or incorporated in the descriptive diagnosis.

The greater difficulty is designating a manner of death. Because of the effects of the violent struggle, one cannot classify such a case as a natural death. The choice then is either homicide or accident. Since a violent struggle has occurred with interaction between two or more individuals, the best

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