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Excited delirium syndrome (ExDS): Redefining an old diagnosis

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ABSTRACT

Recently, the National Institute of Justice (NIJ) of the United States of America convened a meeting of experts in the area of Excited Delirium Syndrome (ExDS). The history of ExDS, the clinical presentation, the pathophysiology, differential diagnoses and management options were discussed. Though the specific pathophysiological pathways of ExDS have yet to be formally defined, considerable research has been undertaken on this topic. It is important for law enforcement, medical and other healthcare professionals to be familiar with current knowledge about the syndrome. This paper summarizes the current state and knowledge of ExDS.

1. Introduction

The formation of the ExDS Workshop Panel and the examination of this issue was a requirement derived from the NIJ's Technology Working Group (TWG) on Less-Lethal Devices. The Panel included members from the field of law enforcement, including active field officers and trainers, emergency physicians, psychiatrists, forensic physicians, forensic pathologists, molecular biologists and scientists (see Table 1). The group met in April, 2011 to review available data and provide feedback on directions the NIJ should consider in the future, with the specific goal of reducing deaths in subjects with symptoms consistent with ExDS.

Traditionally, the forensic medical community has classified patients who presented with altered sensorium and aggressive agitated behavior, and a combination of other symptoms including "superhuman" strength, diaphoresis, hyperthermia, propensity to break glass, attraction to light or lack of willingness to yield to overwhelming force, who then died with a positive drug screen for sympathomimetic agent, and no other anatomic cause of death, as an "Excited Delirium" death. In recent years, it has become increasingly clear that many patients with this constellation of symptom's and signs have been managed in emergency departments for decades and in only a small minority of cases is the outcome fatal. The clinical phenomenon was described in the 1800s, but only in recent years has a clearer understanding developed about this syndrome and a recognition that research needs to be directed to identifying the underlying pathophysiological and cellular mechanisms.

2. Is Excited Delirium always fatal?

The term "Excited Delirium" has been used to refer to a subcategory of delirium that has primarily been described retrospectively in the forensic literature. For that reason, many have felt the diagnosis required sudden death of the individual. Law enforcement and emergency medical services (EMS) in the USA have many years of experience of dealing with ExDS patients. Individuals with ExDS most frequently come to the attention of law enforcement professionals because of the associated violent, agitated, and erratic behavior. Emergency medical services are often called to sedate or transport over-stimulated ExDS subjects after the individual has been arrested and restrained, or to treat victims of ExDS-associated cardiac arrest. These out-of-hospital ExDS subjects have traditionally been transported to custody and survived, transported to the hospital and survived, or have a sudden cardiac arrest with death ensuing. If death occurs, a forensic autopsy is required. When the outcome is fatal, medical examiners will, in the absence of other apparent causes of death, typically rule that death is a consequence of excited delirium. Thus, this presentation bias had led to the development of the concept that ExDS is always a fatal condition.

The concept of excited delirium has become a matter of increasing concern for emergency physicians and other primary care health professionals as many work with policing agencies responsible for the policy and procedures and are used in the field

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Table 1
Members of the National Institute of Justice Technology Working Group (TWG) on Less-Lethal Devices who met in Seattle, WA on April 2011 (this manuscript does not reflect this group's opinions. They are listed as credit to their participation in the TWG).

Dr. Cindy Bir (Wayne State University)
Dr. W. Bosseau Murray (Penn State)
Dr. Bill Bozeman (Wake Forest University)
Amanda Brooks
Officer Tom Burns (Seattle Police Department)
Dr. David Carlbom (University of Washington)
Mr. Joe Cecconi (NIJ/DOJ)
Dr. Michael T. Compton (G. Washington University)
Dr. Marcus Copus (University of Washington)
Dr. Donald Dawes (Lompoc Valley Medical Center)
Dr. Andrew Dennis (Cook County Sheriff)
Ms. Theresa G. Di Maio
Dr. Vincent J.M. Di Maio
Sgt Fred Farris (Lenexa Police Department)
Dr. Chris Hall (Vancouver Island Health Authority)
Dr. Richard Harruff (Chief Medical Examiner, King County)
LTC (USA-Ret) Ed Hughes (Penn State)
Sgt Joel Johnston (Vancouver Police Department)
Dr. Steven Karch (University of Miami)
Dr. William Kraemer (University of Connecticut)
Tom Linn
Col (USMC-Ret) Andy Mazzara (Penn State)
Sgt Brian Muller (Los Angeles County Sheriff's Department)
Keith Murray (Chicago)
Officer Chris Myers (Seattle Police Department)
Norm Nedell (Seattle Medic One)
Dr. Jason Payne-James (UK-Consultant Forensic Physician)
Dr. Darrell L. Ross (Valdosta State University)
Dr. Kent E. Vrana (Penn State-Pharmacology)
Dr. Gary M. Vilke (University of California San Diego)
Dr. Mary Williams (JNLWD – ASC)
Mr. Rick Wyant (Washington State Patrol)

to advise on and manage these patients. Earlier recognition, intervention and proactive treatment might result in fewer deaths from this syndrome.

3. Case definition

Clinical identification, and therefore identification of ExDS is challenging; the spectrum of behaviors and clinical signs overlap with many other disease presentations. Evaluation and subsequent treatment interventions directed at these alternate diagnoses, such as hypoglycemia or hyperthyroidism, may potentially resolve the clinical symptoms and findings of the subject who has symptoms consistent with ExDS. Faced with the lack of a clear definition and pathophysiologic etiology, ExDS has more recently been defined as a *syndrome* instead of a unique disease.

The American College of Emergency Physicians (ACEP) recently supported a Task Force that was charged with reviewing the current state of the medical literature on the topic of ExDS. The group was also tasked with finding ways to educate emergency physicians about the problem. These recommendations were published on the ACEP website as a formal White Paper accepted by the ACEP Board of Directors. Though many of the deaths from ExDS may not be preventable, there is likely to be a subset of patients where early treatment might be life saving. At the current time, based on the best medical evidence, it is impossible to know how many patients have been saved by emergent therapy. The National Association of Medical Examiners (NAME) had accepted the term "Excited Delirium" a number of years ago.

4. History of ExDS

In the 1800s, Dr. Luther Bell, the primary psychiatrist at the McLean Asylum for the Insane in Massachusetts was the first to describe a clinical condition with a 75 percent mortality rate. The behavior described in these cases, or cases with a similar constellation of symptoms and features, has been referred to "Bell's Mania." For more than 150 years there have been dozens of case reports of the same symptom complex, but with different names. These have included, but are not limited to, "manic-depressive exhaustion", "lethal catatonia", "acute delirious mania", "acute psychotic furors exhaustive syndrome", and "typhoma". These patients all manifested clinical findings and outcomes that are extremely similar to of the symptoms of what we refer to today as ExDS.[1] These historical cases primarily occurred at facilities and institutions that housed mentally disturbed individuals.

Reports of ExDs-like cases appear to be absent from medical journals by the mid-1950s.[2] This decline in deaths has been largely attributed to the initiation of antipsychotic pharmaceutical therapy. Medications, like thorazine, changed psychiatric practice from one of monitoring and observing, to one of active intervention with the aid of pharmacologic treatment. Very often, the result was subsequent de-institutionalization and community placement.

Then, in the 1980s, a number of case reports and case series were published, each describing patients with similar behavior noted by Bell and others 100 years earlier. However, in these "modern" cases, very few were related to undiagnosed or untreated psychiatric illness but, rather, appeared to be associated with cocaine abuse and their appearance coincide with the introduction of cocaine into the United States.[3,4] In addition, other drugs, including methamphetamine, phencyclidine (PCP) and lysergic acid diethylamide (LSD) which have also been linked to the occurrence of this syndrome.[5–10]

In 1985 a subset of cocaine deaths was described in a paper by Wetli and Fishbain. In that paper the term "excited delirium" was coined.[11] The group of patients they were describing had acute cocaine intoxication, but not an overdose, and often there was a history of mental illness, particularly conditions involving paranoia. Because these patients always presented with agitated behavior, law enforcement was often called to the scene. The usual outcome was a struggle, often involving the use of other physical or chemical control measures, including use of conducted energy weapons (CEW), OC spray and, ultimately restraint. Typically, after police had restrained the patient, sudden and unexpected death occurred. Autopsies, which did not include histochemical or neurochemical examination, did not reveal a definite cause of death, although trauma and natural disease were excluded.

5. Is ExDS a diagnosis?

The argument about whether ExDS is an actual diagnosis mainly centers on the issue that certain organized medical associations, particularly the American Medical Association (AMA) and the American Psychiatric Association (APA) do not recognize ExDS as a diagnosis.[12] Their failure to do so hinges on the fact that the medical coding reference materials, including the International Classification of Disease, Ninth Revision (ICD-9), do not recognize the exact term "excited delirium" or "excited delirium syndrome."[13] However, the National Association of Medical Examiners (NAME) and the American College of Emergency Physicians (ACEP), the most likely physicians to encounter these patients, do recognize ExDS as a discrete diagnostic entity.

The ICD-9 does have billing codes that describe the clinical presentation of ExDS patients, including 96.00S Manic Excitement, 293.1J Delirium of Mixed Origin, 292.81Q Delirium, drug induced, 292.81R Delirium, induced by drug, 307.9AD Agitation, 780.09E Delirium, 799.2AM Psychomotor Excitement, 799.2V Psychomotor Agitation, and 799.2X Abnormal Excitement. As a unifying diagnostic term was not required to charge for providing care to these patients in the emergency department, there was no financial