

Sudden Death Proximal to Police restraint: medical issues

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What is my interest? (1)

- Case occurred in hospital when I was a resident
 - Lack of medical knowledge
- Risk to subjects
 - Deaths of young people in prehospital situations
 - Until now not much medical interest
- Risk to providers
 - Situational risk
 - Litigation risk
- Lack of evidence based protocols to address care

What is my interest? (2)

- Societal risks
 - Loss of confidence in police
 - Loss of officers for police services
- Mitigate harm
 - Harm to subjects
 - Harm to families*
 - Harm to individual officers

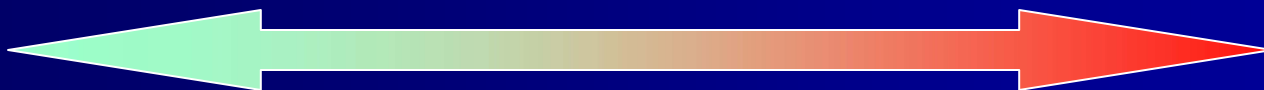
What do we know about sudden death proximal to police restraint?

- 10-20 deaths/yr in Canada (~200 in USA), numbers prior to CED development
- 15 Taser related events in Canada
- 155 in North America since the 80's
- The denominator for CED usage is high*
- No data on incidence of Excited Delirium
- 77% die at the scene of their arrest, or while being transported to cells or hospital.
 - (Ross, 1998)

Delirium

- a state of altered level of consciousness with impairment of cognition AND perception
- a symptom of an underlying disorder and is not a diagnosis of its own
- a continuum of behavior from obtunded to extreme agitation

Obtunded



Agitated

Delirium

- Common vision: a person delirious with fever lying in a bed of tangled sheets unaware of surroundings
- More common form of agitated or excited delirium: true delirium tremens
- Cause cannot be determined from a distance, patient can only be judged as being in a delirious state

How is "excited delirium" diagnosed?

- is NOT a freestanding diagnosis of its own
- is NOT the same as malignant hyperthermia or neuroleptic malignant syndrome
- deaths previously labelled "In custody death syndrome"
- many physicians have only passing knowledge of agitation states
- no one has yet quantified reliable indicators*

Features of excited delirium: on history

- Known or suspected drug or alcohol intoxication
- Previous psychiatric history, especially schizophrenia or mania
- Previous similar events

Features suggestive of excited delirium, visible at a distance

- Bizarre, irrational behavior
- Constant yelling/screaming/"keening"
- Aggression toward inanimate objects
- Glass attraction
- Inappropriate attire: often naked or semi clothed

Features of excited delirium on contact with the subject...

- Does not respond appropriately to police presence
- Apparent insensitivity to pain: hand to hand fights, dogs, bean bags, OC spray
- Very hot skin
- May or may not sweat profusely, may seem profoundly dry

Features of the struggle...

- Apparent superhuman strength
 - Usually require multiple officers
 - Out of proportion with physical traits
- Violent struggling despite futility
 - Struggling against handcuffs, hobble >15 min
 - Facial smashing in vehicle
 - Kicking windows of vehicle

Excited delirium causes

- Psychiatric illness: acute psychosis
- Drug intoxication: cocaine, methamphetamine, PCP, ETOH
- Combination of psych illness and drugs
- Hypoglycemia
- “Cocaine excited delirium” has acquired its own title, is a subset of the cases

Cocaine

- 1999 25 million Americans admit to at least one use
- 1.5 million were current users
- Increase of 82% in new users 1994-98
- 30% of all drug related ED visits
- 50% of users report psychotic symptoms with every use
- Most common cause of drug related deaths reported by ME's

1999 ED data. Drug Abuse Warning Network,
August 2000

Cocaine adverse effects

- effects cannot be anticipated
- can be first time or hundredth time use
- delirium, psychosis
- Metabolic acidosis
- Myocardial ischemia/infarct
- Arrhythmia
- Hyperthermia
- Methamphetamine*

Features of the death

- Occurs once subject is “successfully” restrained
- Occurs within 5 minutes of subject becoming quiet
- First symptom of impending death is the death
- Virtually never* successfully resuscitated
- Occurs in police cars, cells, ambulances and hospitals

Why is risk of death “high” for subjects with excited delirium who undergo restraint?

- We have no proof that it is high*
- No one knows which (patient or restraint) features are predictive
- Some proven associations
- Much theory, suggested pathophysiology and implicated comorbidities...

Positional Asphyxia: the debate

- subjects still dying unexpectedly in police custody even when not placed in a face down hog-tied position
- Reay's research unable to be replicated
 - (Chan:PFT's/sats; Vilke, Neumann et al: recruits)
- Ross et al , 1998
- 61 cases of death, 20% blamed on positional asphyxia
- 38% of all subjects who had died had been prone/"hogtied"
- Conclusions: death more related to Excited Delirium than to the restraint position

Drug toxicity

- Cocaine related heart attack
 - Subject and officer may not be aware
- Cocaine related dysrhythmia
 - Subject and officer will not be aware
- Drug levels

Metabolic acidosis

- We all know the “burn” of a good workout
- Lactic acid builds up as muscles are forced into anaerobic metabolism
- We compensate for increased acidity by increasing ventilation (get rid of CO₂)
- Physiologic pH range is narrow: 7.35-7.45
- VERY bad things happen at pH <7.0
- Delirious people may exert themselves well past their physiologic threshold inducing metabolic acidosis and are barely compensating

Metabolic Acidosis in Restraint-Associated Cardiac Arrest

- Acad Emerg Med: 1999. Vol 6 (3), 239-243; Hick et al
- n =5, Restraint associated cardiac arrest and profound metabolic acidosis
- Struggling against restraint may worsen/cause metabolic acidosis
- Stimulant drugs may promote further acidosis
- Restrictive positioning may impede appropriate resp compensation
- Further investigation of sedative agents and buffering therapy is suggested

Effective restraint and subsequent hypo-ventilation

- Limiting the physical exertion of the agitation may limit the metabolic acidosis, BUT...
- Effective restraint (regardless of the method) may cause relative hypoventilation
- Darned if you do, darned if you don't

Why control the subject at all?

- Trivialisation of the condition:
- “Where officers have reason to believe that a violent individual has a mental illness, efforts should be made to involve mental health specialists in dealing with the disturbed person...”
- “police have to learn to deescalate confrontations with agitated people, if 5 foot 2 female social workers can do it, cops can too”
- People who make these recommendations, do NOT understand the characteristics of excited delirium

The therapeutic relationship

- Trivialisation of the excited delirium state leads people to believe that a “talk down” is possible
- Initial physical control of these subjects will continue to be required
- Psychiatrists do not undertake cognitive therapy with acutely delirious subjects
- Allowing to run rampant is not harmless
 - Risk to subject
 - Risk to persons and property
- EMS/MDs cannot engage an unrestrained subject
 - There is no blowdart
 - Many EMS services do not carry sedative agents

Where does the Taser[®]/CED factor in?



Taser electrophysiology that is not appreciated

- 50,000 volts is a scary number
- “Volts that shock, amps that kill”
- External cardioversion uses on average 50-200 joules, large pads to overcome skin resistance
- Single taser discharge is 0.3 to 1.76 joules
- Stacking charges is not the issue from a cardiac perspective
- Much debate

Taser research

- PACE report, January 2005
 - Pacing and Electrophysiology Journal
 - McDaniel and Stratbucker, swine study
 - Discharge of field taser has extremely low prob of VF

- Air Force Pig Study, Jauchem et al
- 18 cycles in 3 minutes
- Serum pH, pCO₂ and lactate
- All deteriorated

NIJ study

- Two programs
- Bozeman et al: number and severity of injuries with “less lethal” force
- Emerg dept reporting of injuries

- University of Wisconsin
- Pig study
- Mapping taser current in the body

Taser abstract : presented at SAEM 2005

- Cardiac Monitoring of Subjects Exposed to the Taser ; Levine et al
- prospective, interventional, pilot study
- police officers receiving training on the Taser X-26
- continuous 3-lead ECG monitoring
- no significant cardiac dysrhythmias in healthy human subjects

Methodologic problems: reporting bias, publication bias, selection bias

- Anecdote and sensationalization
- all subjects in all studies to date were healthy adult volunteers
- not representative of restraint subjects in medical and law enforcement settings
- Not suffering Excited Delirium because of psychosis or drug
- Conclusions on both sides can be criticised

What's an officer to do?

- It is ***NOT*** reasonable to expect police officers to:
 - make any medical assessment to differentiate between causes of Excited Delirium
- It ***IS*** reasonable to:
 - try and recognize Excited Delirium early
 - Involve EMS where relevant

Situational features predictive of violence (EMS)

- Police presence OR 2.8 (1.8,4.4)
- Gang presence OR 2.9 (1.6,5.3)
- Psych disorder OR 5.9 (3.5,9.9)
- ETOH/drugs OR 7.0 (4.4,11.2)

Grange T, Corbett SW. Prehosp Emerg Care 2002.
Apr-Jun. 6 (2) 186-90 Taser shock.

Pharmacologic Restraint

- Is NOT a guarantee of safety
- These subjects die after chemical restraint
- 3 in Calgary Health Region in 5 years
- So, now what?

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National outcome study into prehospital resistance to officers and methods of restraint - a prospective study of individual and situational characteristics and risk of death proximal to police restraint in 11 urban centers in Canada.



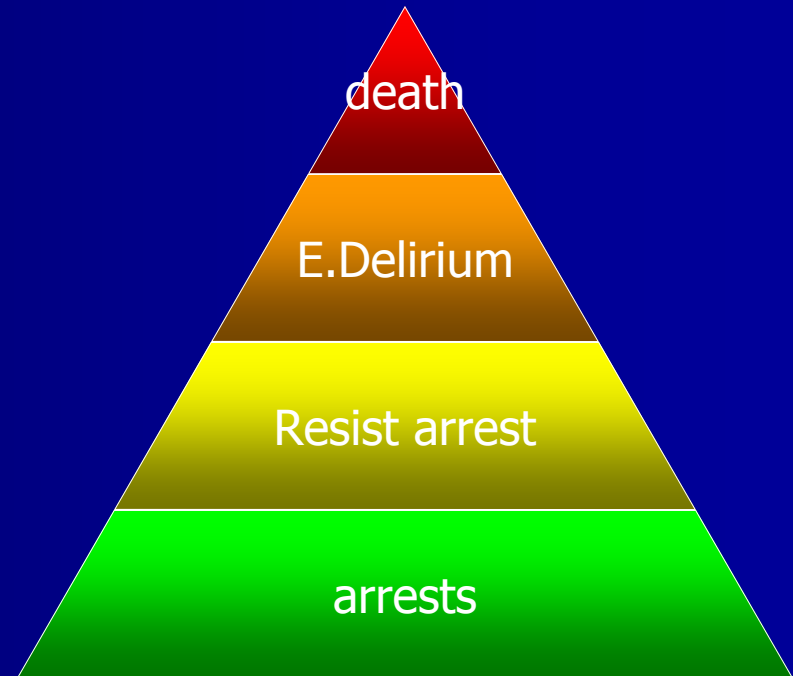
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Phase 1 : non intervention

- Collect data on ALL persons resisting arrest
- SOME will have features of excited delirium
- SOME will undergo restraint, including multiple forms of restraint
- SOME will die



Phase I

- We will be able to determine case fatality rates for:
 - arrest
 - resisting arrest
 - excited delirium features
- We will be able to determine predictive factors for death proximal to police restraint
 - Situation characteristics
 - Subject characteristics
 - Restraint method

Final thoughts

- restraint of agitated subjects is complicated
 - interplay of subject, restraint and pathophysiology
- Associations are rampant, true causality is exceedingly unclear
- Anecdote is very problematic (publication and reporting bias)
- MUST engage in good science
- Protocols need to be flexible/adaptive
- Lack of knowledge promotes fear
- Physicians are becoming engaged
- Unique opportunity for national, multiagency collaboration

Questions?

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