



Presentation by Dr. John C. Butt to the Braidwood Inquiry: May 21, 2008

A Primer to Understanding Cause of Death Issues during a Law Enforcement Take-down with Special Reference to the Taser® Conducted Energy Weapon (CEW)

[Present role as an independent pathology consultant.]

1. Sudden death investigation:

- role of the coroner – ‘Who, When, Where, Why, How’ * see 2 below
- What is forensic pathology? Pathology is the study of disease or injury of tissue; forensic pathology: Study commonly through autopsy of causes of sudden/unexpected/unexplained death.

e.g., The role of the pathologist (forensic pathologist) in Taser associated deaths: Conduct of an autopsy to determine a medical cause of death (= ‘Why he/she died?’) & any other features that may bear upon the death.

2. The role of a coroner or medical examiner in Taser associated deaths:
Statutory obligations (provincial death certificate information*) including answering to:

- the medical cause - a disease or injury
- the manner of death - natural (disease) and unnatural (injury) see * below
- overall: the circumstances of death.

[In the inquest/public inquiry these questions will be answered as an outcome of process according to the provincial statute *including a conclusion about the unnatural entities of suicide/homicide/accident]

3. The pathological features (i.e. variation from the normal anatomy) of death following Taser use:

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- nothing specific - no *fatal* features unique to the use of Taser;
- autopsy cannot determine a recent cardiac arrhythmia nor seizure including proximate to the time of death;
- microscopic changes in striated muscle *rhabdomyolysis* possibly due to hyperthermia;
- possibly associated features: blunt injury either directly related to the weapon (spinal compression fractures) or indirectly due to falling, 'dart' injuries especially to eye, burns;
- pre-existing disease may be important especially cardiac disease.
- When abnormal features aren't found at autopsy, events close to time death become important. ['proximate event(s)'] in the circumstances of death .

4. **Circumstances of death associated with Taser -"excited delirium" (Bell's mania circa 1849)**

Excited delirium(ED) is seen with other forms of "take down" (using less - than - lethal force.) Excitatory drugs-especially cocaine and amphetamines as well as acute psychosis (mania associated with acute bipolar or acute schizophrenic disorders commonly with neglect/voluntary withdrawal of medications) predisposing to a pattern of extreme agitation can lead to sudden unexpected death. The latter has occurred with this syndrome before the Taser contrary to what was said in a recent CMAJ report: ["Tasers in medicine: an irreverent call for proposals" CMAJ: 178 (11), 2008; 1401-02.]

Call it what one may, notwithstanding objections to the term "excited delirium", death investigators and emergency department practitioners recognize a pattern of agitated behavior in the following symptoms and signs:

- Hyperactive behavior-running around aimlessly usually shouting;
- Agitation including from lights and reflections in glass and mirrors
- Hyperthermia;
- Sweating
- Feats of strength, disposed to resist force, numbness to pain.

Proximate events at time of collapse; results of attempts at apprehension:

- a. Variety of use of force modalities in apprehension/take down.
- b. Outcome during & following force/take down: sudden death is a distinct possibility
- c. Death in ED: Pathophysiology, cause of death (asphyxia vs metabolic acidosis); distinctive pathology re: cause of death is often absent.
- d. Pre-existing disease especially cardiac may seriously effect outcome when the Taser is used:

A study 2001-2004 at the University of Washington reviewing autopsy findings in Taser associated deaths [Strote and Hutson: Prehospital Emergency Care. 2006; 10(4); 447-450]:
 75 fatalities less than 24 hours after Taser
 37 persons with autopsy reports available
 54% victim showed coronary artery disease
 78% of victims tested positive for an illegal substance
 76% of victims had the "excited delirium" diagnosis
 27% the Taser was considered a potential or contributory cause

- e. No Taser-related dysrhythmias have been documented in tens of thousands of training exposures and "real world" deployments by law enforcement. However, the high voltage / low amperage pulsed electrical waveform produced by these weapons is unique, its human effects have not been fully characterized, and concerns about electrical safety have not yet been fully addressed. [Bozeman WP. Winslow J. E. Medical Aspects of Last Lethal Weapons. The Internet Journal of Rescue and Disaster Medicine 2005. Volume 5 Number 1.]
- f. When the anatomical cause of death is elusive, by studying the proximate events one hopes for clues to understanding *mechanism of death* a broader based, less well defined entity, e.g. "asphyxia." On this account there is need for a "freeze-frame" review.

5. Gathering data about Taser casualties:

- Problems gathering stats re: extent of deployments; reasons for (e.g., behavior), victim reactions/injury; confusing data (e.g., scene & witness info, autopsy results/ cause of death.) On the
- A variety of opinion is found in medical literature concerning the effects of CEW including the validity of the pig model. Some articles are contradictory of others. [Pippin John J. Taser Research in Pigs Not Helpful. J Am Col Card.2007 Feb 13; 49(6) 731-32.]
- Some articles have been written by persons associated with Taser International.

6. Important unanswered questions:

- a. What is the mechanism of (fatal) collapse in Taser and related deaths?
- b. Are fatalities with Taser different from sudden death fatalities with CS (pepper spray); with positional/restraint use of force (prone position, hog tie, neck restraint)?
- c. What studies are ethically possible to focus on the above two questions?
- d. Why would one curtail the use of Taser if it is an option to the use of lethal force?