Introduction

Conducted Energy Weapons (CEWs) such as the TASER® are increasingly used by law enforcement agencies. These weapons have been associated with reduced overall injury rates among suspects and officers, but significant controversy remains about their safety. CEWs can cause injuries, and a number of in-custody deaths have occurred proximal to their use. Studies in animal models and healthy volunteers are important but cannot substitute for studies in the actual population at risk of Taser exposure.

No population based injury epidemiology studies have been performed to date. The likelihood and severity of injuries after CEW use in real world conditions remains unreported.

Objectives

We sought to perform the first large, independent study describing both the incidence of injuries associated with CEW use and their severity.

Methods

A prospective, multicenter cohort study was performed at six law enforcement (LE) agencies of varying sizes across the United States. All criminal suspects that received a CEW electrical discharge during their apprehension over a two year period (7/2005 – 6/2007) were included.

A tactical physician/site investigator at each agency reviewed police records and medical records for each case.

Federal HIPAA privacy laws allow LE agencies to retrieve medical records as part of an administrative investigation of police use of force.

Injuries were identified upon case review and classified as mild, moderate, or severe based on a priori definitions (Table 1). The relationship of injuries to the CEW was classified as direct, indirect, or uncertain.

De-identified case reports were sent to the central study site. Descriptive analysis was performed including determination of observed proportions and 95% confidence intervals.

Results

962 CEW uses occurred in participating agencies over a 2 year period. All cases were reviewed.

- 94% of subjects were male, with a mean age 32 yrs (range: 13 – 80 yrs) height 69 inches (range: 54 – 80 inches), and weight 184 lbs (range: 50 – 360 lbs).

- 96% of cases utilized the Taser® model X26, 4% utilized the model M26. 66% of cases utilized probe mode, 26% utilized drive stun mode, and 8% utilized both. The mean number of shocks delivered was 1.6 in probe mode and 1.8 in drive stun mode.

CEW body impact areas are shown in Table 2.

All suspects underwent pre-incarceration medical screening; 390 subjects (42%) were also evaluated by EMS; 205 subjects (21%) were evaluated at a hospital.

- Injuries after CEW use:

  - 743 cases (77.2% (96% CI) )
  - 216 cases (22.5% (96% CI) )

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- All suspects underwent pre-incarceration medical screening; 390 subjects (42%) were also evaluated by EMS; 205 subjects (21%) were evaluated at a hospital.

- Injuries after CEW use:

  - None 743 77.2% (96% CI)
  - Mild 216 22.5% (96% CI)
  - Moderate 2 0.2% (96% CI)
  - Severe 1 0.1% (96% CI)

- Three significant injuries (a composite of moderate and severe) requiring hospital admission were seen (0.3%, 95% CI 0.05 – 0.63%) including:

  - Rhabdomyolysis, n=3 (mod severity, uncertain relationship to CEW).
  - Cerebral contusion, n=3 (mod severity, indirectly related to CEW).
  - Epidural hematoma, n=3 (severe, indirectly related to CEW).

- Two in-custody deaths occurred in the study cohort. Neither occurred immediately after CEW use. After investigation and autopsy, both were determined to be unrelated to CEW use.

Conclusions / Discussion

- After CEW use, 99.7% of 962 subjects had no injuries or mild injuries only.

- The observed significant (moderate or severe) injury rate was 0.3%, and is unlikely to be greater than 1%.

- Skin punctures from CEW probes, contusions and lacerations account for 99.5% of mild injuries after CEW use.

- These data provide the first large, independent, multicenter assessment of the safety of CEW devices under real world conditions.

- These findings support the safety of CEW use by law enforcement agencies.

- It is important to recognize that CEWs are not risk free. Significant injuries, while rare, can be caused by these weapons. Steps should be taken to prevent these injuries when possible and to address them when they do occur.

Limitations

- This observational cohort study could not mandate specific assessments or interventions.

- The reported incidence of mild injuries likely underestimates the true incidence of minor abrasions, contusions, etc.