Cardiac & Diaphragm ECHO Evaluation During TASER Device Drive Stun

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Introduction

The TASER Electronic Control Device (ECD) is currently available for law enforcement and civilian use. ECDs are used on subjects to control or repel violent/agitated behavior in two ways. The primary method is deployed probes. Human research, to date, has primarily examined this method. The second method is the Drive Stun (DS), comprised of direct contact with the front ECD electrodes. ECD research to date has primarily been done utilizing deployed probe based methodology. There has been limited information reported on the DS application, which is used in this study.

The DS method of application is known to cause a painful stimulus but, unlike the deployed probes, it is not believed to cause regional muscle incapacitation. ECDs have been the subject of scrutiny since individuals occasionally die unexpectedly sometime after DS exposures. Criticism of the DS has occurred and a causal relationship has been hypothesized through cardiac or respiratory compromise. This project examines this possibility.

Discussion

In the United States, TASER ECDS are often used by law enforcement agencies to control or subdue people. There have been arrest-related deaths reported in situations where an ECD has been used at some point during the arrest process. Although these types of deaths also occur when ECDS are not present, they have been scrutinized as potential contributory factors. 1-6

To date, human research examining modern-day ECDS has not found a contributory connection. 7-9 However, most of this research has utilized the theory of deployed probe methodology. Deployed probe methodology should theoretically yield results that are applicable to a worst-case scenario due to the greater separation distance of the electrical current contact points. While no connection has been found, there have been claims of injury or death based on DS ECD application methods. 10

This work represents initial investigatory human research to examine the possibility of a connection between DS ECD application and worsening, measurable human physiology.

Results

21 subjects were enrolled. 10 had cardiac and 11 had diaphragm views. For the subjects with cardiac views, the pre-exposure mean heart rate was 95.2 ± 14.8, range 82 to 114. The mean heart rate during the first pulse of the ECD exposure was 139.0 ± 14.7, range 111 to 150. The mean heart rate during the last pulse of the exposure was 131.6 ± 16.7, range 106 to 156.

All cardiac views were confirmed to be normal sinus rhythm throughout the monitoring period. The mean heart rate one minute after exposure was 93.1 ± 19.5, range 55 to 118. The diaphragm was noted to move consistently with respirations during all ECD pulses in all subjects with diaphragmatic views.

Conclusions

Drive Stun exposure did not cause abnormal rhythms or apnea in this small sample of ECD exposed subjects. There was an increase in heart rate that resolved within one minute of the exposure. We did not find a connection between measurable, worsening human physiology and ECD DS exposure. This work is consistent with previously reported findings of human ECD studies utilizing deployed probe methodology.