

15-Second Conducted Electrical Weapon Application Does Not Impair Respiratory Parameters, Venous Blood Gasses, or Blood Chemistries and Does Not Increase Core Body Temperature

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INTRODUCTION:

The authors previously reported a study in which it was demonstrated that a 15-second exposure from the TASER X26[®] conducted electrical weapon (CEW) did not significantly impair several respiratory parameters including respiratory rate, tidal volume, PETCO₂, and the PETO₂.

This study expands on that protocol, with the additional determination of venous blood gases, blood chemistries, and core body temperature.



METHODS:

The methodology of the respiratory data collection was previously reported. As with the previous study, the weapon was an off-the-line, field deployable device with the only modification being the programming to allow for the 15-second discharge, instead of the 5-second discharge in field deployed weapons.

In this study, venipuncture was obtained immediately preceding the experimental set-up, and then immediately after the exposure to the CEW. Venous samples were run on the iSTAT to obtain pH, PCO₂, PO₂, HCO₃, Lactate, Na, and K. In addition, subjects swallowed a telemetric temperature recording capsule which sampled core body temperature every 15 seconds.

RESULTS:

Eighteen (18) subjects were enrolled in the study. The results of the respiratory data showed no significant changes before, during, or after the exposure except an increase in respiratory rate during the exposure.

The blood chemistries showed a statistically significant decrease in potassium (-0.23), pCO₂ (-5.69), HCO₃ (-3.4), a statistically significant increase in pO₂ (10.8) and lactate (1.8), and no significant change in pH (0.0009) or sodium (0.07) post-exposure.

There was no change in temperature from one minute before the exposure to one minute, 10 minutes, or 20 minutes after the exposure in the majority of patients. One patient had a 0.2 degree increase at 20 minutes, three patients had a 0.1 degree decrease in temperature at 10 minutes or 20 minutes.

CONCLUSIONS:

As with the previous study, this study suggests that exposure to a CEW does not significantly impair respiration. As in the previous study, pCO₂ decreased and pO₂ increased as a result of the exposure. There was no change in blood pH. There was no change in core temperature, changes in K and lactate were small.

While this study is small, it adds to the growing body of literature that is demonstrating that these weapons have a favorable risk-benefit ratio and are appropriate additions to the use of force continua of police agencies.

