



Electrocardiographic Evaluation of a Long-Range Electronic Control Device (ECD) Exposure in Human Volunteers

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Introduction

The TASER® eXtended Range Electronic Projectile (XREP™) is a new Electronic Control Device (ECD) that has a range of over 60 feet and is a self-contained unit designed to incapacitate a subject without an electrical tether.

This is the first human study to evaluate the effect of this device on the electrocardiogram.



Methods

Subjects were a convenience sample of law enforcement volunteers. The XREP circuit was connected to the skin by electrical contacts. Placement was thoraco-abdominal in all subjects. The minimum exposure time was 15 seconds. In 27 subjects, the device was programmed for 45 seconds, and they could terminate the device voluntarily after 15 seconds.

In the remaining subjects, the device was programmed for 20 seconds, ECGs were captured before and immediately after the exposure with the Welch Allyn Cardioperfect software. Electrical noise and movement artifact precluded evaluation during the exposure. ECGs were read by a blinded cardiologist.

Results

A total of 33 subjects had ECGs done before and after the exposure. The variable exposure subjects had a mean exposure of 16.7 seconds. 13 subjects had a decrease in heart rate ≥ 10 bpm after the exposure (maximum 37 bpm).

No subjects were bradycardic. 2 subjects had an increase in heart rate ≥ 10 bpm (maximum 11) after the exposure. 15 subjects had no change. 4 subjects had an atrial dysrhythmia consisting of non-conducted premature atrial complexes (PACs) or an ectopic atrial rhythm. 1 subject had a morphology change consisting of normalization of TWI inferiorly. This subject was asymptomatic after the exposure.

Conclusion

The XREP ECD does not appear to induce any concerning changes in the ECG in humans after exposures greater than 15 seconds.

Changes were consistent with increased vagel tone after the exposure consistent with a noxious exposure.

Raw Results

Subject 1	Sinus Tachycardia - 5	Subject 17	Increased - 11
Subject 2	Decreased Heart Rate - 20	Subject 18	Decreased Heart Rate - 30
Subject 3	Decreased Heart Rate with Transition to an Ectopic Atrial Rhythm - 5	Subject 19	No Change
Subject 4	Decreased Heart Rate - 19	Subject 20	Sinus Tachycardia - 5
Subject 5	No Change	Subject 21	Decreased Heart Rate Ectopic Atrial Rhythm, PACs - 37
Subject 6	Non-Conducted PACs Decreased - 5	Subject 22	No Change
Subject 7	No Change Increased - 7	Subject 23	No Change
Subject 8	Decreased Heart Rate - 35	Subject 24	No Change
Subject 9	Decreased Heart Rate - 20	Subject 25	Increased - 10
Subject 10	No Change	Subject 26	No Change
Subject 11	Decreased Heart Rate Non-Conducted PACs - 28	Subject 27	No Change
Subject 12	Decreased Heart Rate - 23	Subject 28	Decreased Heart Rate - 15
Subject 13	No Change	Subject 29	Decreased Heart Rate - 13
Subject 14	Decreased Heart Rate - 16	Subject 30	No Change
Subject 15	Decreased Heart Rage - 37	Subject 31	Decreased Heart Rate - 15
Subject 16	Normalization of TWI Inferiorly	Subject 32	No Change
		Subject 33	No Change