

## Medical Examiner Collection of Comprehensive, Objective Medical Evidence for Conducted Electrical Weapons and Their Temporal Relationship to Sudden Arrest

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**Abstract :** Background: Conducted electrical weapons (CEW) are now used in 107 countries and are a common law enforcement less-lethal force practice in the United Kingdom (UK), United States of America (USA), Canada, Australia, New Zealand, and others. Use of these devices is rarely temporally associated with the occurrence of sudden arrest-related deaths (ARD). Because such deaths are uncommon, few Medical Examiners (MEs) ever encounter one, and even fewer offices have established comprehensive investigative protocols. Without sufficient scientific data, the role, if any, played by a CEW in a given case is largely supplanted by conjecture often defaulting to a CEW-induced fatal cardiac arrhythmia. In addition to the difficulty in investigating individual deaths, the lack of information also detrimentally affects being able to define and evaluate the ARD cohort generally. More comprehensive, better information leads to better interpretation in individual cases and also to better research. The purpose of this presentation is to provide MEs with a comprehensive evidence-based checklist to assist in the assessment of CEW-ARD cases. Methods: PUBMED and Sociology/Criminology data bases were queried to find all medical, scientific, electrical, modeling, engineering, and sociology/criminology peer-reviewed literature for mentions of CEW or synonymous terms. Each paper was then individually reviewed to identify those that discussed possible bioelectrical mechanisms relating CEW to ARD. A Naranjo-type pharmacovigilance algorithm was also employed, when relevant, to identify and quantify possible direct CEW electrical myocardial stimulation. Additionally, CEW operational manuals and training materials were reviewed to allow incorporation of CEW-specific technical parameters. Results: Total relevant PUBMED citations of CEWs were less than 250, and reports of death extremely rare. Much relevant information was available from Sociology/Criminology data bases. Once the relevant published papers were identified, and reviewed, we compiled an annotated checklist of data that we consider critical to a thorough CEW-involved ARD investigation. Conclusion: We have developed an evidenced-based checklist that can be used by MEs and their staffs to assist them in identifying, collecting, documenting, maintaining, and objectively analyzing the role, if any, played by a CEW in any specific case of sudden death temporally associated with the use of a CEW. Even in cases where the collected information is deemed by the ME as insufficient for formulating an opinion or diagnosis to a reasonable degree of medical certainty, information collected as per the checklist will often be adequate for other stakeholders to use as a basis for informed decisions. Having reviewed the appropriate materials in a significant number of cases careful examination of the heart and brain is likely adequate. Channelopathy testing should be considered in some cases, however it may be considered cost prohibitive (aprox \$3000). Law enforcement agencies may want to consider establishing a reserve fund to help manage such rare cases. The expense may stay the enormous costs associated with incident-precipitated litigation.

**Keywords :** ARD, CEW, police, TASER

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