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All authors have reported that they have no relationships relevant to the contents of this paper to disclose.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: Case Reports* [author instructions page](#).

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Electrical Weapons and Electrophysiology



Drs. Barbhaiya and Johar wrote excellent expositions on the first documented case of an implantable cardioverter-defibrillator (ICD) shock due to conducted electrical weapon (CEW) discharges (1,2).

To appreciate the rarity of the event, there have been more than 4 million field uses of just the TASER brand (Axon, Scottsdale, Arizona) of CEW.

CEW use reduces the non firearm arrest-related death rate by 59% to 66%, consistent with the two-thirds reduction in firearm fatalities in agencies where CEW use was not overly restricted (3). The 2 key injury studies, covering collectively more 40,000 uses of force, found that the CEW reduced subject injury by 65% to 78% (4).

It is misleading to state that CEW use is associated with asystole. Asystole is the most common cardiac arrest rhythm with drug and alcohol abuse, but it is not inducible with electrical stimulation (5). Hence, any association is artificial.

The editorial suggests a risk of myocardial capture and cites a report of a prison rioter having an

asymptomatic elevated heart rate during a CEW discharge to the chest. That was not direct capture but, rather, the result of the pacemaker housing funneling some CEW charge directly into the right ventricle via the pacemaker lead (6).

Of greater concern is the repetition of the myth that humans have ever been electrocuted by a CEW. All present Taser CEWs deliver <2 W, which satisfies the 5 to 7 W allowed by the UL electric fence standard (UL, Northbrook, Illinois), as well as the international (International Electrotechnical Commission, Geneva, Switzerland) and the European (CENELEC, Brussels, Belgium) 2.5-W limit. They also satisfy the CEW-specific American National Standards Institute (Washington, DC) CPLSO-17. All TASER brand CEWs satisfy all relevant electrical safety standards and, thus, neither injury nor electrocution is expected or has ever been confirmed.

Both the report and the editorial cite a series of 8 expert-witnessing cases. What was not cited, however, was the invited case-by-case refutation of those 8 cases and 4 other published anecdotes (7).

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Dr. Kroll is a member of Axon's Scientific and Medical Advisory Board and is on Axon's corporate board. Drs. Calkins and Luceri are members of Axon's Scientific and Medical Advisory Board. Dr. Witte has reported that he has no relationships relevant to the contents of this paper to disclose.

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REPLY: Electrical Weapons and Electrophysiology



We appreciate the kind words of Dr. Kroll and colleagues regarding our case report highlighting the circumstances under which implantable cardioverter-defibrillator (ICD) shock may result from conducted energy weapon (CEW) discharge, such as the TASER device (Axon Enterprise, Inc., Scottsdale, Arizona) (1). Our expertise, and the focus of our report, is in cardiac electrophysiology. Thus, our report focused on the technical aspects of ICD tachyarrhythmia detection algorithms and the circumstances that would lead to inappropriate ICD therapy delivery.

Although the less-lethal nature of CEW use is well accepted, there remains debate within the scientific community regarding the degree and nature of injury that may result from CEW discharge. We appreciate the perspective of Dr. Kroll and colleagues, who as members of the corporate, scientific, and medical advisory boards of Axon Enterprise, Inc., the manufacturer of TASER brand devices, attest to the relative safety of these devices in their letter to the editor and prior responses to reports of CEW-related injury. Speaking as physicians and citizens, we are concerned that the letter from Dr. Kroll and colleagues may downplay the important public health issues addressed in the editorial (2).

CEW use can directly result in death through cardiac arrest. A training bulletin issued by the manufacturer of the Taser device acknowledges that the risk of sudden cardiac arrest related to Taser discharge is not zero but, rather, “extremely low” (3). The reduction in power delivery in more recent models is acknowledged by the manufacturer to have a “significantly improved safety margin” (4). Furthermore, there is evidence that, in addition to being used to avoid lethal force, many U.S. police agencies deploy CEWs more routinely to subdue unarmed, noncompliant, or disturbed individuals who do not pose a serious danger to themselves or others. (5) Reassurance that the CEW death rate is low disregards the potential harms that may result from CEW discharge (4,6). A full appreciation of device risks and benefits is, therefore, made difficult or impossible.

ALARA (as low as reasonably achievable) is a concept embraced within the cardiology community

regarding medical radiation use. Although the risk of radiation exposure related to medical imaging is “extremely low,” it is not zero. Because the benefits of this radiation are clear, we aim to minimize harm while optimizing benefit. Similarly, we believe that our case report contributes to the body of evidence suggesting that although there is a role for CEW use in law enforcement, its use should be ALARA.

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