

First study to test real-world effects of stun gun use raises questions about safety

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The rate of sudden deaths increased six-fold in the first year that California law enforcement agencies deployed the use of stun guns, according to a UCSF study. Findings also showed a two-fold increase in the rate of firearm-related deaths during the same time period.

The most widely used brand of stun gun is the Taser, and the team surveyed for outcomes related to the deployment of this device.

While some industry-funded controlled human studies have shown Tasers to cause no harm, this study suggests that their real-world effects pose greater medical risk and more danger than previous reports, said study author Zian H. Tseng, MD. Although the device has been advertised to decrease the number of shooting deaths and officer injuries, study outcomes showed an increase rather than a reduction in the rate of shooting deaths and no change in officer injuries following Taser deployment, he added.

Researchers found that rates of sudden and firearm-related deaths declined back to near pre-deployment levels after the first year of Taser usage. The team postulated that law enforcement agencies self-corrected, likely adjusting their usage protocol or technique after the first year.

Study findings are published online today (Jan. 22, 2009) by the *American Journal of Cardiology*. The journal will also publish the study in an upcoming print edition.

"Physicians and law enforcement agencies need real-world knowledge of the effects of Taser use so that risks can be weighed in establishing appropriate policies and techniques," said Tseng, who is senior author on the paper and assistant clinical professor in cardiology at UCSF. "There have been a number of animal and controlled human studies, but none that test how Tasers are used in the real world, where subjects may have pre-existing medical conditions or be under the influence of narcotics."

Under the Public Records Act and the Freedom of Information Act, researchers mailed surveys to 126 police and sheriff departments in California cities and the 10 largest cities in the U.S. The survey requested three types of information: the rates of in-custody sudden deaths in the absence of lethal force, firearm-related deaths, and officer injuries requiring emergency room visits.

Data on the rates of sudden death pre- and post-Taser deployment were provided by 50 cities, while 21 cities reported firearm deaths and four cities reported officer injuries. None of the 10 largest U.S. cities returned surveys. The team used total annual arrest data per city as reported by the Department of Justice.

For each law enforcement agency that responded, researchers gathered data for the five years prior to the deployment of Tasers and for five years after. This allowed the research team, which included epidemiologists, cardiologists and statisticians, to observe how device deployment impacted the number of emergency events that a law enforcement agency experienced.

"Sudden deaths are extremely rare events, but it is important to look into why these events happen and whether law enforcement agencies are fully informed of the real-world risks of Taser deployment," said Byron Lee, MD, first author on the paper and assistant clinical professor in cardiology at UCSF.

Stun guns like the Taser deliver a high-frequency, high-voltage current to incapacitate victims by causing momentary neuromuscular incapacitation. They are in use by over 12,000 law enforcement, military and correctional agencies in the U.S. and abroad, according to reporting by Taser International Inc.

Although not examined in this study, Tasers have been demonstrated to cause fatal ventricular tachyarrhythmias, or rapid irregular heartbeat, by capturing the heart at a higher, more dangerous rate. The increased adrenaline state resulting from a struggle and multiple, prolonged device applications near the heart may also make a person more vulnerable to sudden death.

"If law enforcement agencies using Tasers understood the risks and were trained to recognize cardiac arrest, sudden death events could be averted with timely deployment of external fibrillation or by knowing where not to apply the device's current, such as near the heart," Tseng said.

The research team noted limitations in its study, which was observational, such as a lack of information about reported sudden death events and the possibility that survey responses could be inaccurate. Also, the analysis only included a portion of cities known to be using the Taser. Several California cities and all of the largest U.S. cities surveyed were unwilling to release information.

"Further epidemiologic research is clearly needed. Without full transparency by law enforcement agencies, it is possible that our observed outcomes may actually be an underestimation of the real risks of Taser use," Tseng added.

Source: University of California - San Francisco

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