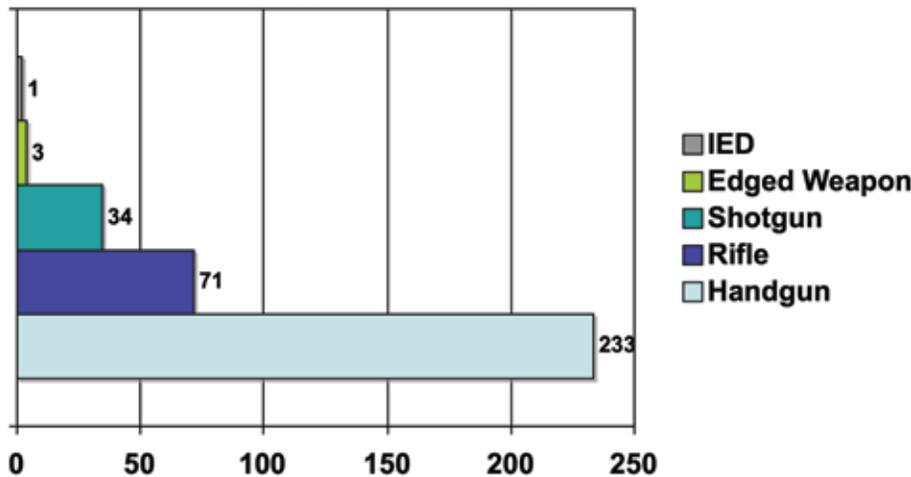


Learning from tragedy: Preventing officer deaths with medical interventions

By Matthew D. Sztajnkrycer, MD, PhD, FACEP

Figure 1: Weapons used

Note: More than one weapon type may be used during each incident.



In the United States, a police officer is feloniously assaulted every nine minutes; on average, 53 are murdered each year. Despite these stark numbers, no widely accepted law enforcement-specific medical training exists to guide medical care under conditions of active threat. Medical decision-making priorities during these circumstances more closely reflect those faced by soldiers in combat than those encountered during civilian EMS response. As a consequence of this knowledge gap, increasing efforts are being made to translate military tactical medical care to the civilian law enforcement setting.¹

Tactical Combat Casualty Care (TCCC) is the current U.S. standard of care for combat field medical care.²⁻⁴ Elements of TCCC have been featured in numerous police professional journals. In contrast to traditional civilian prehospital care, TCCC de-emphasizes airway management and

protecting the cervical spine, instead prioritizing the use of tourniquets for control of life-threatening extremity bleeding. Experience gained during combat operations in Iraq and Afghanistan indicates that TCCC has saved countless lives in a forward operating environment.⁵⁻⁸

Despite strong evidence to support the use of TCCC in combat, no studies have examined the appropriateness of TCCC for law enforcement medical care. Unlike the military, the law enforcement community has not performed studies examining the types of lethal injuries suffered by officers during felonious assault, nor possible interventions to prevent death or disability. In this article, I summarize open-source data from the FBI Uniform Crime Reporting (UCR) Law Enforcement Officers Killed and Assaulted (LEOKA) program for the years 1998 – 2007 in order to report how officers die during law enforcement opera-

tions, and to discuss how specific medical interventions might have saved them.

FBI UCR LEOKA data

Over the 10-year period, LEOKA summaries were available for 533 line-of-duty deaths occurring due to felonious assault. As the purpose of this review was to assess the appropriateness of translating TCCC to the law enforcement setting, only “immediate” line-of-duty deaths were included in the analysis. Immediate deaths are defined as those occurring within an hour from the time of wounding, and therefore reflect those officers most likely to die of wounds in the field without immediate lifesaving interventions.

This review further excluded victim officers who suffered multi-system blunt traumatic deaths, typically as the result of being deliberately hit by a motor vehicle. These officers were not included due to the complex nature of blunt trauma, the lack of simple field interventions to prevent death and the emphasis on penetrating trauma in combat medicine and the TCCC literature.

A total of 341 victim officers remained in the final analysis. Weapon type is listed in Figure 1. Locations of all injuries and fatal injuries are shown in Figure 2. The most commonly identified causes of death were head trauma (198 victim officers) and chest trauma (90 victim officers). 123 deaths were identified as being potentially preventable. In the absence of definitive medical or forensic data, a death was considered potentially preventable if the fatal injury provided the opportunity to either perform a TCCC skill set lifesaving intervention

or definitive airway management. Victim officers dying from immediate head trauma were classified as non-preventable deaths, even if they had other non-fatal injuries that may have been amenable to management using the TCCC skill set.

Extremity trauma and tourniquets

According to military data, 61% of all preventable combat deaths are due to bleeding to death from isolated extremity trauma (Figure 3).^{9, 10} As a result, TCCC emphasizes extremity hemorrhage control (circulation) over airway management in the combat setting. According to TCCC, the only medical procedure to be performed while under conditions of active threat (“care under fire”) is tourniquet application for rapid control of life-threatening extremity bleeding. There is now a large body of research supporting the lifesaving capability of modern one-handed tourniquets.¹¹⁻¹⁵

In contrast to the military experience, only two of 341 victim officers died from isolated extremity hemorrhage over the past decade, accounting for 1.6% of

potentially preventable deaths (Figure 4). During a single incident in 1998, both officers sustained penetrating trauma to the femoral artery from 7.62 x 39mm assault rifle fire and bled to death at the scene. Of note, no law enforcement death due to isolated extremity trauma has been reported since 1998. This may reflect rapid access to modern trauma and prehospital care systems in the United States, circumstances which frequently do not exist in austere combat settings. Alternatively, it may also reflect different wounding patterns encountered in military combat (as with IED-associated blast injuries) versus those seen in law enforcement felonious assaults. Lastly, this may reflect the successful use of tourniquets by law enforcement, such that deaths were prevented; near-misses are not included in the LEOKA database. Based upon the available data, however, the focus of TCCC on control of life-threatening extremity hemorrhage may be over-emphasized in the law enforcement setting.

This does not mean that there is no role for tourniquets in law enforcement tactical

medicine. Tourniquets are inexpensive, and they save lives when injuries result in life-threatening extremity hemorrhage. They also provide a training tool that emphasizes the concept that medical care under conditions of active threat is another tactical variable. Tourniquet drills provide officers an opportunity to practice rapidly changing focus from tactical to medical, and importantly, back to tactical. More than a lifesaving procedure, tourniquet training instills a mindset that can become critical in saving lives and preventing further injuries while under fire.

Chest trauma and needle decompression

According to military data, the next most common cause of preventable death in combat is tension pneumothorax (33%, Figure 3)⁹⁻¹⁰, which occurs when a collapsed lung causes pressure to build up in the chest cavity, compressing the heart and great vessels (“tension”). The end result is shock and eventual death. Based upon this data, TCCC emphasizes the recognition and management of tension pneumothorax in its medical skill set.

According to the LEOKA data, 129 of the 341 victim officers (37.8%) suffered chest trauma (Figure 2). In 90 cases, the injury was considered the cause of death. Because of the limited medical data provided in the LEOKA report, it is not possible to determine the specific cause of death. It is likely that the majority of these deaths occurred from fatal hemorrhage due to injuries to the heart or great vessels and therefore were not preventable. It is also possible that at least some of these officers died from

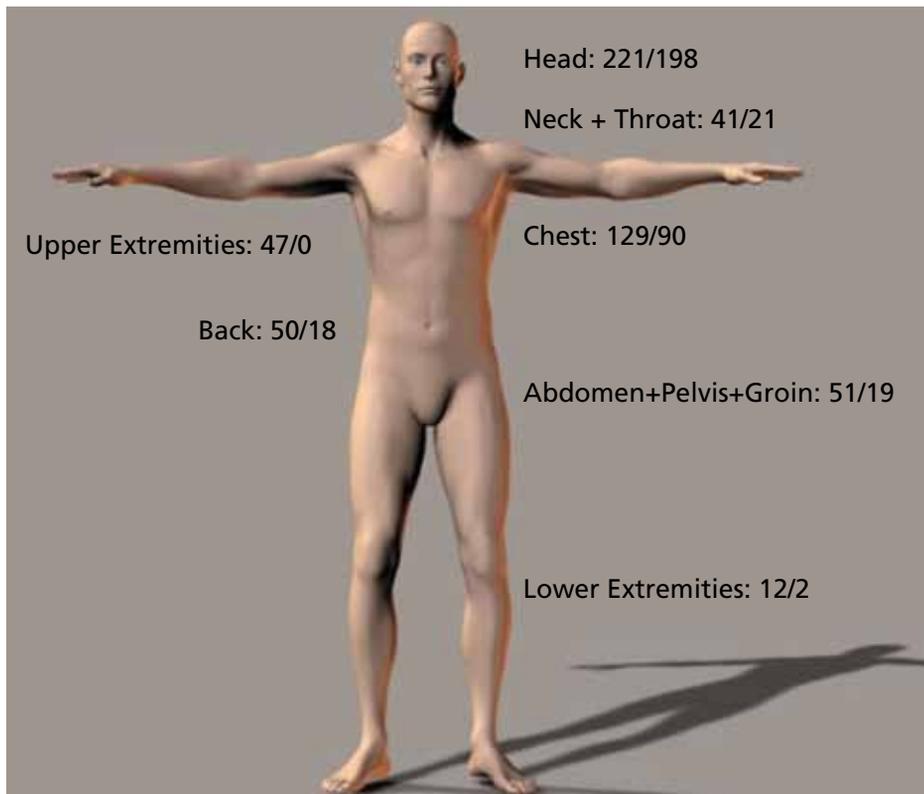


Figure 2: Body location of injuries/fatal injuries reported in LEOKA

Note that more than one injury may occur in the same officer in the same location, or in different locations. The first number refers to the total number of injuries in a specific location. The second number refers to the number of injuries ruled as the cause of death.

Figure 3: Causes of preventable death in combat
(Adapted from Reference 9)

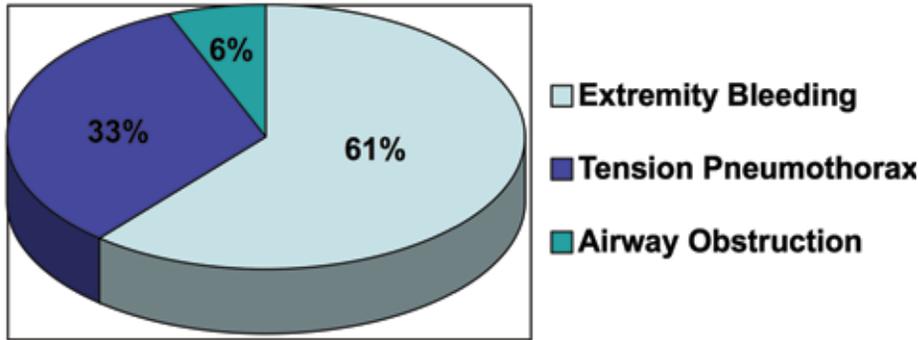
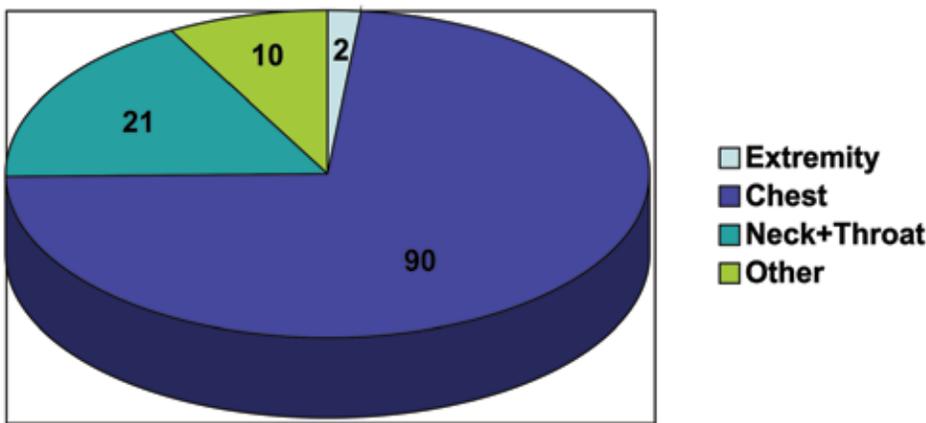


Figure 4: Locations of potentially preventable police officer deaths



undiagnosed and untreated tension pneumothorax. Military data would suggest that 11 to 29 of these 90 officers could have died from tension pneumothorax.^{9,10,16} If true, death from tension pneumothorax would be 550% to 1450% more common than death from isolated extremity hemorrhage among law enforcement officers. If this finding is indeed correct, law enforcement tactical medical training should place heavy emphasis on the recognition and management of this condition.

Treatment of tension pneumothorax involves inserting a large gauge needle into the chest cavity to vent the trapped air, a procedure called needle decompression. In the civilian setting, this is considered an advanced, paramedic level skill beyond the capabilities of most police officers. However, the military considers this skill so critical that it is taught to non-medical

combat lifesavers. The military experience demonstrates that non-medical personnel can safely and rapidly perform this skill in a limited setting. While law enforcement data experience is limited, a recent study of law enforcement tactical personnel showed they were able to retain this skill set for a period of greater than six months.¹⁷

Neck trauma and airway management

As only 6% of preventable combat deaths are due to airway compromise, TCCC prioritizes airway management secondary to control of life-threatening extremity bleeding.^{9,10} LEOKA data indicates that injury to the neck/throat area was responsible for the deaths of 21 victim officers, accounting for 6.2% of all deaths (Figure 2, 4). It is likely that some of these deaths occurred due to spinal cord in-

jury or injury to the carotid artery and/or jugular vein. However, airway compromise may have contributed to some of these deaths and might have been preventable with timely medical intervention. Airway management in TCCC is limited to placement of a nasopharyngeal airway (NPA). Unfortunately, in the context of penetrating neck wounds, it is unlikely that this simple approach would have any effect on the outcome. In this circumstance, more definitive airway procedures (such as surgical airway placement) are often required. These advanced airway procedures are beyond the scope of practice of most police officers.

Self-care, buddy-care, policemen and soldiers

The placement of a one-handed tourniquet is considered a self-care skill, although realistically it is often performed by others as buddy-care. The remaining TCCC skills are all buddy-care procedures. It has been said that “Policemen are soldiers who act alone; soldiers are policemen who act in unison.”¹⁸ In combat, the majority of soldiers operate in groups of three or more. In law enforcement, many officers patrol individually, and rely upon back-up response for assistance. In the current study, 145 victim officers had no back-up present at the time of their fatal wounding. When considering only those with potentially preventable deaths, 44 officers who might have benefited from life-saving interventions had no assistance present at the time of their injury. This lack of immediately available buddy aid contrasts with typical military operations, and will decrease the ability of TCCC or other medical skill sets to impact preventable law enforcement deaths.

Tactical officer deaths

During the 10-year period examined in the LEOKA study, 12 officers died while performing tactical missions, including high-risk warrant service. In every case, other officers were present at the time of the fatal injury. In all but one case, LEOKA

explicitly stated that ballistic armor was worn by the victim officer. One officer died while engaged in a downed officer rescue of another officer. All officers died from gunshot wounds to the head/face area. No case was potentially preventable.

What do these findings mean for TCCC?

The LEOKA data reviewed in this article suggest that the causes of preventable death encountered by law enforcement differ from those observed in the military. Additionally, the buddy-aid that TCCC relies upon is frequently unavailable in the law enforcement setting. Does this mean that TCCC has no role in law enforcement medical training? Unequivocally no.

TCCC is first and foremost a conceptual approach to treating combat casualties. It emphasizes that providing medical care under conditions of active threat is another tactical decision that must be analyzed in achieving the overall objective. It emphasizes the importance of avoiding additional casualties as a means of accomplishing the mission. These fundamental principles are sound and appropriate for law enforcement personnel facing medical decisions under conditions of active threat.

In terms of specific skill sets and treatment priorities, TCCC prioritizes the immediate need to control severe extremity hemorrhage above all other procedures. It is the only medical procedure to be considered during the care under fire phase of tactical medical management. While appropriate to the austere combat setting, and certainly life-saving in both theory and practice, the need for this intervention is rare, as indicated by the current law enforcement study. That said, rare does not mean unnecessary. The use of a tourniquet might well have saved the lives of two officers during the 10-year study period. From a cost-benefit standpoint, the nominal cost and clearly demonstrated efficacy of a modern, one-handed tourniquet supports the use of tourniquets by law enforcement personnel.

Similarly, although diagnosis and management of tension pneumothorax should be a priority skill for law enforcement personnel based upon this study, officers must continue to follow basic TCCC concepts in deciding when and where to treat injured officers. The right procedure performed at the wrong time or place might result in the further officer deaths or injuries.

Finally, it must be noted that the LEOKA data set is limited. It does not capture every line-of-duty death. More importantly, as previously mentioned, LEOKA does not capture information on circumstances in which officers were critically injured yet survived their wounds ("near misses"). Analysis of these near miss events, in terms of the nature of their injuries and why they survived, would be extremely valuable in further refining treatment skill sets and priorities for law enforcement personnel. Unfortunately, at present, no such data exists. Further study is needed to better examine the causes of preventable death in law enforcement officers, as well as the most appropriate law enforcement tactical medical skill set and treatment priorities. ◀◀

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