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James R. Gill,[1] *M.D. and Melissa Pasquale-Styles,*[1] *M.D.*

Firearm Deaths by Law Enforcement

ABSTRACT: The use of deadly force during law enforcement is a matter that compels public scrutiny. There were 42 gunshot deaths caused by police over a 4-year period in New York City. The decedents' average age was 31 years and ranged from 17 to 64 years. There were 41 males and one female; and 26 Black, nine Hispanic, and seven White decedents. Ethanol and/or drugs of abuse were detected in 78% (31/40) of the decedents. The vast majority of shootings occurred with the police responding to a crime and 90% of the decedents were armed (26 handguns, six knives, one axe, one metal pipe, and one toy gun). Vehicles were used as weapons in two incidents. A total of 177 bullets struck the 42 decedents. Fourteen decedents sustained single gunshot wounds (GSWs), and the remainder had multiple GSWs ranging from 2 to 21. In the majority of the cases in this study, the number of GSWs of the body was three or fewer. Thirteen decedents had at least one GSW of the back or buttocks, accounting for 25 of the total 177 wounds, and four of the 13 had GSWs of only the back. With the exception of the upper extremities, GSWs of all locations were more likely to penetrate than perforate. Although these deaths may be high profile, the certification is typically straightforward and the cause (i.e., GSW) and manner of death (homicide) are readily apparent. Although police shootings in which the decedent was unarmed and/or sustained numerous GSWs are widely reported by the lay press, these types of shootings were not typical in our study.

KEYWORDS: forensic science, forensic pathology, homicide, police, gunshot wounds

The use of deadly force by law enforcement often entails the public interactions of the police, district attorneys, social activists, the media, elected government officials, families of the victims, and the medical examiner/coroner (1–5). The forensic pathologist who investigates, performs the autopsy, and certifies these deaths often is scrutinized and second guessed. Decedents' families may distrust the medical examiner/coroner and request a second autopsy. The major concern is whether there was justification for the use of deadly force.

The high-profile instances of these deaths involve issues of justification and "overkill." One component of this analysis is the number of gunshot wounds (GSWs), their location on the body (e.g., in the back), and the range of fire. Fortunately, these data are objective and easily documented. Such findings, however, must be incorporated with the entire case investigation before justification aspects can be considered.

Instances involving unarmed individuals and/or those with numerous GSWs (often inflicted by more than one person) are guaranteed to be scrutinized (4–6). The high-profile nature of these deaths alone may skew the public's perception of law enforcement deaths. We reviewed 42 such deaths that occurred over a 4-year period in New York City. We examine the circumstances, epidemiology, and number and location of GSWs of these deaths.

Materials and Methods

The New York City Office of Chief Medical Examiner (NYC OCME) investigates all unexpected, violent, and suspicious deaths in New York City. By statute, these deaths must be reported to the OCME. Between January 1, 2003 and January 1, 2007, there were 2,530 homicides and 1,929 suicides investigated and certified by the NYC OCME. We searched all medical examiner death certificates between January 1, 2003 and April 1, 2007 in which the decedent died due to GSWs inflicted by one or more law enforcement agents ("shot by police"). There were five additional police-shooting deaths identified by medical examiner record review in which the death certificate did not list the police involvement ("shot by another"). We reviewed the medical examiner records which included the autopsy, toxicology, police, and medical examiner investigators' reports. All deaths underwent autopsy and toxicology testing. The law enforcement agents were City Police (NYPD) in all but one death in which the State Police were involved. Two police officers were off duty when the incident occurred.

Manner of death is determined from the circumstances and cause of death. The manners of death listed on the United States Standard Certificate of Death include: natural, accident, suicide, homicide, and undetermined (7). The medicolegal definition of homicide is death at the hand of another or death due to the hostile or illegal act of another (8). The demonstration of intent to kill is not required for a death to be certified as homicide. Intent is used in criminal proceedings to determine legal degrees of homicide (e.g., manslaughter vs. murder). In addition, the susceptibility or vulnerability of the decedent does not absolve the instigating injury. If the injury contributed to death, it will dominate the determination of the manner of death. If there was a clear intent by the decedent to cause his death through police action, then the death was certified as suicide. Two such deaths that were certified as suicides ("suicide by cop") were excluded from our analysis (9–11). In New York City, all police shootings are investigated by the police internal affairs division and the District Attorney's Office. The District Attorney decides if a police-related shooting goes before a grand jury.

Postmortem blood was collected in each case, preserved with sodium fluoride, and stored at 4°C. All toxicologic testing was performed by the Forensic Toxicology Laboratory at the Office of Chief Medical Examiner. Ethanol concentrations were determined in blood using head space gas chromatography. Urine specimens were routinely tested for opiates, barbiturates, benzoylecgonine

[1]New York City Office of Chief Medical Examiner and Department of Forensic Medicine, New York University School of Medicine, New York, NY.

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(BE), and methadone by enzyme immunoassay. In cases where urine was not available, blood was tested for opiates, benzoylecgonine, and barbiturates using radioimmunoassay. Quantitations of morphine, codeine, and benzoylecgonine were done using gas chromatography/mass spectrometry (GC/MS). Urine or blood was also analyzed for basic drugs (including cocaine) by gas chromatography with a nitrogen phosphorous detector (GC/NPD).

Results

There were 42 homicides due to GSWs inflicted by law enforcement in New York City during the study period**.** The decedents' average age was 31 years and ranged from 17 to 64 years. There were 41 males and one female. The ethnic breakdown, according to the identification by the next-of-kin, was: 26 Black, nine Hispanic, and seven White. The survival interval following the injury was none to 12 years. Nine people were pronounced dead at the scene and 21 were pronounced dead within 1 h of arrival at the hospital. With the exception of two people, the remainder died within 24 h of admission to the hospital. One person died of complications 11 days after being shot, and one died 12 years later of complications of paraplegia caused by his injuries.

Toxicology analysis was performed on all decedents including testing the admission hospital bloods on two of the four individuals who survived more than 3.5 h in the hospital. The original hospital admission blood and any hospital toxicology results were not available for analysis in the death that occurred 12 years after the injury. Ethanol and/or drugs of abuse were detected in 78% (31/40) of the decedents. The detected drugs of abuse included: 15 cannabinoids, 14 ethanol, 10 cocaine/BE, and one amphetamine. Seven decedents had a history of psychiatric illness.

All but one of the decedents had injuries caused by handguns; one death had rifle and handgun injuries. The majority (90%, 37/41) of the decedents possessed a weapon (in one instance a realistic-appearing toy gun). There were 26 handguns, six knives, one axe, one metal pipe, and one toy gun (carried by an adult impersonating a police officer). Four decedents did not have a weapon and it is unknown if one decedent had a weapon. In two additional incidents, vehicles were used as weapons. In one instance, the driver pinned a police officer against another car during a traffic stop and in the other the driver allegedly attempted to ram an undercover police officer with his car.

A total of 177 bullets struck the 42 decedents (see Fig. 1). Fourteen decedents sustained single GSWs, and the rest had multiple GSWs ranging from 2 to 21, not including the rare additional injury caused by fragmented (ricochet) bullets or secondary missiles. More than one police officer was involved in all instances of decedents that sustained eight or more GSWs. The number of shots fired is unknown to us.

TABLE 1—*Number of gunshot wounds by body region and penetration/perforation.*

Body Location	Number of Penetrating GSWs	Number of Perforating GSWs	Number of Graze Wounds	Total
Head/neck	13	5	0	18
Anterior chest	33	6	0	39
Abdomen	11	5	0	16
Flanks	5	1	1	7
Posterior torso	19	5	1	25
Upper extremities	12	17	3	32
Lower extremities	17	16	3	36
Torso, not otherwise specified	2	0	0	2
Unknown	–	–	–	2
Total	112	55	8	177

The body locations of the GSWs are listed in Table 1. There were 112 penetrating, 55 perforating, and eight graze wounds (two remote wounds were undetermined). The "torso" injuries were described in a delayed death (12 years after injury); a precise location of the entrance wounds could not be determined. No gunshot residue (fouling or stippling) was observed on the skin surrounding the wound or in the wound track in any instance; the range of the remote GSWs in the paraplegic victim is unknown. The clothing of 29 decedents was available for examination by the medical examiner, and no discernible gunshot residue was reported.

The circumstances of the shootings are listed in Tables 2 and 3. The most common reason for the police presence was responding to a crime and for the shooting was the decedents' possession/use of a weapon. The single female decedent was shot as she attempted to stab a neighbor during a dispute. During these incidents, the decedents injured members of service (e.g., police officer, police auxiliary) and civilians. There were seven members of service who were shot (two died). One member of service and two civilians were stabbed in separate incidents. Three civilians were fatally shot by decedents leading up to the police action. Three police officers were off-duty when they responded to a crime and subsequently were shot (one off-duty police officer was shot by the police when he was witnessed pointing a gun at a person who had been a suspected perpetrator in an assault on him). Police officers were

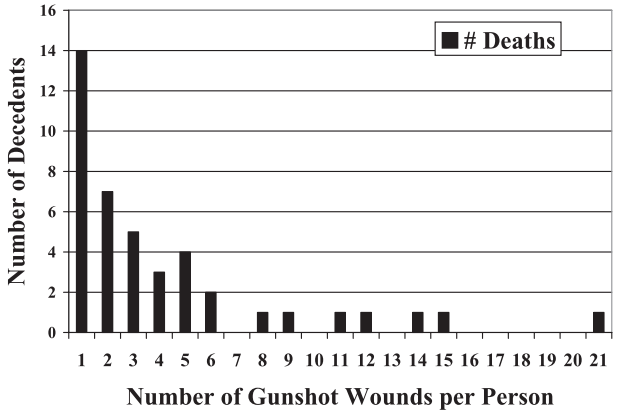

FIG. 1—*Number of deaths versus number of gunshot wounds.*

TABLE 2—*Reason for police presence.*

Reason	*n* (%)
Responded to crime	23 (55)
Routine patrol came upon crime	4 (10)
Disturbance (domestic dispute, shots fired, emotionally disturbed person)	3 (7)
Serving arrest warrant	3 (7)
Off-duty officer responded to crime	2 (5)
Stopped by traffic police	1 (2)
Drug raid	1 (2)
Undercover surveillance	1 (2)
Police closing after-hours bar	1 (2)
Routine patrol unexpectedly encountered civilian in housing project roof stairwell	1 (2)
Guarding crime scene and altercation with civilian working nearby	1 (2)
Unknown	1 (2)

TABLE 3—*Reason for police shooting.*

Reason	*n* (%)
Decedent shot at police; aimed gun at police; pulled out gun; came at police/civilian with weapon	28
Fleeing felon	4
Drove car at police	2
Seen with gun	2
Refused to drop knife	1
Scuffled with police	1
Routine patrol unexpectedly encountered civilian in housing project roof stairwell and fired gun	1
Felt threatened during encounter with unarmed civilian	1
Off-duty police officer was holding his gun (on assault suspect) and was shot by responding police	1
Unknown	1

indicted in two of the 42 deaths. One involved the pursuit on an unarmed man and the other involved police officers shooting at the driver of a car.

Discussion

One of the main duties of forensic pathologists is the meticulous documentation of positive and pertinent-negative autopsy findings. This is done with diagrams, a written report, and abundant photographs. Photographs of the entire body (front and back) record the presence and absence of injury. Documentation of the absence of injury may be as important as the documentation of an injury. The reasons for this extensive documentation are numerous. Since all future questions or accusations may not be anticipated, these photographs can assist the re-examination of objective findings whose significance may not have been recognized at the autopsy table. Secondly, it makes it very clear that the forensic pathologist is not concealing, altering, or minimizing findings. It allows any other expert to examine primary factual evidence and offer their own opinions about an injury or lack thereof.

Families of the decedent may not trust the medical examiner or coroner because of the generally cooperative relationship that exists between the police and public death investigators in other daily case work. This distrust may be potentiated when the forensic pathologist is administratively under a division of law enforcement (e.g., Department of Public Safety, State Police, or County Sheriff-Coroner). Forensic pathologists who are part of the Department of Health, however, are not immune to cynicism on the part of the family. Careful documentation of the injuries and allowance of a privately retained forensic pathologist to observe the autopsy when requested by family may dispel this distrust.

Although these deaths may be high profile, the certification is typically straightforward. The cause (i.e., GSW) and manner of death (homicide) are usually apparent. The proximate cause of death may be obscured if the person survives the acute injury and then succumbs (sometimes years later) to a delayed complication (12,13). In addition, the manner of death may be clouded if there is evidence of the decedent intentionally provoking the police to cause his/her death (so-called suicide by cop) (9–11,14,15). Since the medicolegal definition of homicide is death at the hand of another, the forensic pathologist is absolved of considering intent or the appropriateness of the use of force. Typically, those issues are left to the legal investigation (e.g., grand jury investigation). During this time, the medical examiner may have an important role in the corroboration of witness statements and other evidence by providing information on the direction of the wound tracks, range of fire, and opining on how the injuries may have affected the victim during the course of the event. The criminal assessment of lethal police force, however, is a complex legal question that depends upon numerous factors (appropriate and necessary use of force, imminent danger, etc.) and is best answered by the triers of fact.

"Contagious shooting" is gunfire that spreads among officers who believe that they, or their colleagues, are facing a threat. With the widespread use of semiautomatic pistols (in New York City, the Glock 9 mm is standard issue) that can hold 16 rounds and quickly can be reloaded, numerous bullets may be fired in a short time. With multiple police officers involved, the total number of gunshots can escalate quickly. It is common to see press reports of dozens of shots fired, although the number that strike the decedent are fewer (4). In the majority of deaths in this study, the number of GSWs of the body was three or fewer (see Fig. 1) and the average number of GSWs per person was 4.2 (177/42). These data are similar to the average number of shots fired per officer in all police-involved shootings as reported by the NYPD in 2005; the average number of shots fired in 109 incidents (fatal and nonfatal) was 3.7 shots per officer (4).

The location of the entrance GSW often is cited as evidence to support or dispute the justification for the use of force. The lay public may find it disturbing to hear that a person has sustained GSWs of the back during a police shooting. Thirteen decedents in this study had at least one GSW of the back or buttocks, accounting for 25 of the total 177 wounds, and four of the 13 had GSWs of *only* the back. An entrance wound of the back, however, does not automatically invalidate the possibility of face-forward aggression at the moment an officer decides to fire a gun. A shooting is a dynamic process with split second decisions and movements. It has been demonstrated that a person can turn the torso completely in the fractions of a second that it takes for one to decide to fire a gun and pull the trigger (16).

One study looked at the reaction times of trained police officers and the time it takes for a body to turn (16). The average time of firing a gun after a signal with the finger inside the trigger guard was 0.365 and 0.677 sec starting with the finger outside of the trigger guard. The mean time for a torso to turn was measured: a 90° turn took 0.310 sec and 180° took 0.676 sec. This rapidly dynamic process must be remembered when considering and evaluating the location of an entrance wound. In fact, nine of the 13 decedents with back entrance wounds also had entrance wounds of the front of the body, implying substantial movement by them and/or the shooter, in the absence of multiple shooters.

The location of the entrance also must be considered with respect to the track of the bullet in the body. An entrance wound of the right side of the back does not mean that the gun was fired with the back squarely to the shooter. If the lodged bullet (or exit wound) is located in the lateral left trunk, this is a predominately side to side trajectory as opposed to purely back to front. From the autopsy findings, one is unable to discern if, at the time the gunshot occurred, the decedent was standing still or was turning toward or away from the shooter. In instances of multiple shooters, the likelihood of numerous directions in the body increases. Our data show a wide range of entrance wound locations which would reflect this dynamic process. The distance of the shooter, the movement of the decedent, and the prowess of the shooter all have an effect. Finally, ricochets also should be considered, particularly if the entrance wound is atypical.

With the exception of the upper extremities, GSWs of all locations were more likely to penetrate than perforate the body. Interestingly, even in the upper extremities, wounds were nearly as likely to penetrate as they were to perforate the body. The overall

higher rate of penetration than perforation may reflect the common use of expanding (“mushrooming”) hollow-point bullets by the NYPD**.** A deformed or fragmented bullet is more likely to remain in the body. Penetration without perforation may be desirable in certain police scenarios since it may decrease the risk of exiting bullets striking unintended targets.

Stopping power of a firearm depends upon the injury location, the severity of the wound, and the physiologic make-up of the person who is shot (17). GSWs that pass through the brain or spinal cord usually are immediately incapacitating injuries that cause instantaneous collapse. GSWs of other parts of the body may have a wide time interval between the injury and incapacitation. Even GSWs of the heart may not immediately incapacitate. Most forensic pathologists have examined a decedent with the GSW of the heart who ran a city block before collapsing. The brain has enough oxygen to maintain consciousness for *c.* 12 sec following cessation of blood flow (18,19). A person approaching a police officer with a weapon in hand may continue purposeful, aggressive movements for several seconds after sustaining a GSW of the heart. Thus there are rules of engagement for when such an individual is within a certain distance. Standard police training teaches that a distance of 21 feet is deemed a “safe” distance when interacting with a person wielding a knife (the “Tueller Rule”) (20). If that 21 feet distance cannot be maintained (i.e., the perpetrator advances within 21 feet of a person), then lethal force is used.

The vast majority of police shootings occurred with the police responding to a crime in which the decedent was armed. In addition, most of the decedents had three or fewer GSWs. In two of the reported deaths, the shootings were deemed criminally unjustified as the police officers were indicted by a grand jury.

In conclusion, although police shootings in which the decedent was unarmed and/or sustained numerous GSWs are widely reported by the lay press and publicly scrutinized, these types of shootings were not typical in our study. Police-shooting deaths are often high profile and the forensic pathologist must meticulously document the positive and pertinent-negative autopsy findings. The location of the injuries in combination with the rapid dynamics of body movements need to be considered. In these, as in all deaths, the forensic pathologist is an unbiased fact-finder who may provide findings and opinions that are helpful for the trier of fact. Ultimately, it is up to the district attorney to decide if a grand jury investigation is warranted.

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Additional information and reprint requests:
James R. Gill, M.D.
Office of Chief Medical Examiner
520 First Avenue
New York, NY 10016
E-mail: jgill@ocme.nyc.gov