Int J Legal Med (2009) 123:151–153
DOI 10.1007/s00414-008-0270-2

CASE REPORT

A case of hunting death due to an overpenetrated bullet

Fidelia Cascini · Tommaso Tartaglione · Antonio Oliva · Daniela Marchetti

Received: 30 January 2008 / Accepted: 27 June 2008 / Published online: 6 August 2008

Abstract The authors report the case of a death which occurred during wild boar hunting. The scene details revealed that the victim and the beast were aligned in the visual shooting path and the victim had been struck by overpenetrating bullet shot by his friend on the neighbouring stand. The fatal entrance wound was on the victim's left chest. The authors emphasise the importance of the exhaustive forensic investigation, including autopsy of the beast, in cases like this, in order to distinguish accident from homicide.

Keywords Firearms · Ricochet · Prevention · Forensic medicine

Introduction

Hunting-related shooting deaths are a relevant forensic issue, although a review of the literature has revealed a dearth of information regarding the importance of the pathologist in the reconstruction of this kind of events. Instead, because various strategies and equipment are used for hunting game, the part of the body receiving the fatal wound and the manner of death could require a specific knowledge. Unfortunately, a recent literature search for studies pertaining to hunting-related shooting incidents and comparing different professional skills (pathologist, radiologist, ballistic and veterinary experts) to determine the bullet trajectory and to distinguish manslaughter from unintentional death did not elicit any article. This is the reason why the authors undertook the present study.

F. Cascini (✉) · A. Oliva · D. Marchetti
Institute of Legal Medicine, Catholic University "Sacro Cuore",
L.go Francesco Vito,
1, (00168) Rome, Italy
e-mail: f.cascini@rm.unicatt.it

T. Tartaglione
Institute of Radiology, Catholic University "Sacro Cuore",
L.go Francesco Vito,
1, (00168) Rome, Italy

Case report

A 56-year-old hunter died during a wild boar hunting expedition. The circumstance was reported by the victim's friend who stated that both were standing at their own position to shoot wild boar. At the time the boar was killed, the victim fell down off his stand (n.26) and collapsed.

Scene investigation revealed three rifles: an Express s 689, c.30-06 Springfield, Beretta, (two Federal Cartridges inside) on the victim's stand (n.26); a Raffaello c.20 Special, Benelli (no cartridge inside) on the victim's friend stand (n.25) and an ARGO, c.30-06 Springfield, Benelli, (two Speer "Grand Slam" cartridges inside). Two empty cases of c.30-60 cartridges (Speer "Grand Slam") and two of c.20 cartridges (RWS-GECO) were found on the ground at an average distance of 3.7 m from the right edge of stand n.25.

Hunter's radiological findings

GE Lightspeed 16 Pro detector computer tomography (CT) was performed before the autopsy. It revealed a 2-cm bullet fragment with the nose facing backward in the anterior-septal wall of the right ventricle. Some bone fragments (less than 4 mm) were also found in the posterior right ventricle wall.

Furthermore, CT revealed a left hemothorax, atelectasis of the left lung and rupture up to the right side of the heart. Hemomedistinum and hemopericardium were also observed.

CT scanning finally illustrated a straight line intrasomatic bullet track: 5° from the horizontal plane (down-

ward), 53° from the coronal plane (backward) and 37° from the sagittal plane.

Hunter's autopsy findings

The victim was 168 cm tall and weighed 75 kg. The corpse did not show any injuries other than a roundish (19× 18 mm) wound located next to the sternum, 3.5 cm from the medio-sternal line, 8.5 cm from the sterno-clavicular joint and 131 cm from the left foot. An entrance hole of 5 mm was observed, partially hidden by a triangular skin tag and with a left-inferior bevel (11 mm in size).

The internal examination revealed a penetrating wound at the third left inferior costal edge, a cardiac laceration (1.5 cm) with a contusion at the left inferior pole, no lead fragment, hemopericardium (250 g), hemothorax (1,000 g) and left lung atelectasia.

Autopsy confirmed the bullet location and its intrasomatic track.

Wildboar examination

Radiology and autopsy were performed on the head only due to the absence of lesions on the remaining areas. The boar was a young male weighing 97 kg.

X-rays showed a fracture of the atlas and numerous lead fragments mainly in the left side of the brain.

At the killing zone, 90 cm from the legs, on the left temporo-occipital bone, an entry wound (9 cm) was found. It showed an irregular stellate-shaped rim and a contused edge. The exit wound was smaller and located in the right occipital region.

All the head bones were fragmented and the brain was badly damaged. The occipital bone was 11 mm thick. A wide track was noted running in a straight line from left to right through the atlas and occipital bone.

Ballistic evidence

All the rifles recovered by the police were in working order at the ballistic test.

Leica DM C comparison microscope confirmed that the bullet fragment recovered inside the victim's body was a SPEER cartridge, c.30-06 "Grand Slam" and that was fired by the hunter friend rifle ARGO, Benelli.

The mushroom-like shape bullet fragment consisted of the main part of the semi-copper alloy portion and weighed 6.1 g (53% of the original weight).

Discussion

Forensic pathologists are frequently asked to collect evidence in order to gain a better understanding of the mode of death in shooting accidents. Distinguishing between suicide, accident or homicide is one of the major challenges. As stated by Karger et al. [1], this is because "the basic difference between accident on the one hand and suicide or homicides on the other, is the intention of the person shooting which can be difficult to determine in retrospect". Various publications deal with the autopsy features of suicide and homicide by firearms [1–10], but there is a paucity of literature data on accidental death. During hunting deaths, the problem of differential diagnosis among accident, suicide and homicide may be extremely difficult to solve due to the heterogeneous variables (e.g. improper handling of shotguns, hunters stumbling or slipping, malfunctioning weapons, etc.) [11–14] that can be involved.

The case reported herein is an example of this problem. Comparison of scene investigation results with the morphology of the entrance wound in the victim's left chest, as well as reconstruction of the internal bullet path direction, did not offer reliable information on the manner of death. The intrasomatic bullet direction that was detected by CT scanning has been reported by previous authors in both suicide and homicide circumstances [3–7]. In addition, the paucity and the heterogeneity of the data in literature on accidental shooting [14–20] failed to add any convincing information to aid the reconstruction.

On the other hand, the shortness of the internal bullet path (51.9 mm in length) and the ballistic examination of the retrieved bullet (a mushroom-like shape facing nose-backwards) provided considerable insight into the pre-impact direction of the bullet, the strike angle and the type of surface struck. Collectively, these records prompted us to consider that the bullet must have lost some of its velocity as a consequence of a previous impact and ricochet [21–24]. In fact, while the hypothesis of a loss of momentum resulting in a lower force of impact and penetration is feasible in a bullet fired from a long distance, the reason why a large bullet fired at a relatively short distance from the corpse stopped after covering an internal path measuring only 51.9 mm in the chest could only be that the bullet had lost much of its propulsive force when it hit a hard intermediate target.

The scene investigation did not show any traces, suggesting the impact of a bullet. Instead, the autopsy of the beast's head revealed two gunshot injuries and a wide bullet track from left to right through the atlas and occipital bone.

Impact with the beast's head could thus explain both the reduced velocity of the bullet before it struck the victim and the loss of 47% of its original weight (6.1 of 11 g was recovered), while the mushroom-shaped deformation and the nose-back direction of the bullet fragment in the victim's heart could be explained by ricochet and destabilisation phenomena.

Empirical testing by the firearm examiner confirmed that the gunshot angle on the sagittal plane was about 8.5° towards

the beast's head. Then, considering the distance between the beast and the victim, we estimated by trigonometry that the ricochet angle was almost 4°. Although ricochets are almost unpredictable, this angle of deflection is consistent with those observed on average for most target surfaces: Projectiles usually proceed at a lower angle after impact.

These data have then to be compared with hunting regulations. One of the most important wild boar hunting rules is that each hunter on the stand has to know exactly where the others are because the visual shooting range is at the level of the forehead or the shoulders on the line where the onlookers' stands are located.

In the case reported herein, the beast was found on the line between the two stands outside the allowed visual shooting range. Thus, if one considers that the boar, struck at the proper killing zone, died when hit by the bullet, then the death of one of the hunters should be related to failure to comply with the rules. In addition, empirical firearms testing using the ARGO, c.30-06 Springfield, Benelli rifle revealed that the gunshot angle on the horizontal plane was almost 7.5° to the right side of the beast.

All these data corroborate the hypothesis of accidental death due to a mistake that should be considered by the Italian penal code as culpable homicide. Conversely, the autopsy and radiological findings on the victims revealed that the chest injury was roundish, located next to the sternum and that the intrasomatic bullet track was in a straight line (5° downward, 53° backward and 37° from the sagittal plane). It is reasonable to assume that the victim was facing the boar target, bent forward at the chest in the shooting position, and perhaps also failed to observe the rule of not shooting outside the visual area.

We do not know if the prosecutor will decide for accidental death. Whatever the final decision may be, it is a fact that hunting deaths often occur in spectacular circumstances and that this death could be prevented by safer and more meticulous observation of strict game hunting rules.

Acknowledgements The investigative assistance of Martino Farneti and Stefano Hani has been greatly appreciated. We are grateful to dr. Francesco Ausania and dr. Massimo Senati for the study of the Italian hunting rules.

References

1. Karger B, Billed B, Koops E, Brinkmann B (2002) Autopsy features relevant for discrimination between suicidal and homicidal gunshot injuries. Int J Legal Med 116:273–278
2. Karger B, DuChesne A (1997) Who fired the gun? A casuistic contribution to the differentiation between self-inflicted and non-self-inflicted gunshot wounds. Int J Legal Med 110:33–35
3. Desinan L, Mazzolo GM (2005) Gunshot fatalities: suicide, homicide or accident? A series of 48 cases. Forensic Sci Int 147S:S37–S40
4. Druid H (1997) Site of entrance wound and direction of bullet path in firearm fatalities as indicators of homicide versus suicide. Forensic Sci Int 88:147–162
5. Karlsson T (1999) Multivariates analysis ("Forensiometrics")—a new tool in forensic medicine differentiation between firearm-related homicide and suicides. Forensic Sci Int 101:1409–1421
6. Avis SP (1994) Suicidal gunshot wounds. Forensic Sci Int 67:41–47
7. Eisele JW, Reay DT, Cook A (1981) Sites of suicidal gunshot wounds. J Forensic Sci 26:480–485
8. Solarino B, Nicoletti EM, Di Vella G (2007) Fatal firearm wounds: a retrospective study in Bari (Italy) between 1988 and 2003. Forensic Sci Int 168:95–101
9. de la Grandmaison GL, Fermanian C, Aegerter P, Dirigon M (2008) Influence of ballistic and autopsy parameters on the manner of death in case of long firearms fatalities. Forensic Sci Int 177:207–213
10. Balci Y, Canogullari G, Ulupinar E (2007) Characterization of the gunshot suicides. J Forensic Leg Med 14:203–208
11. Örnehult L, Eriksson A (1987) Accidental firearm fatalities during hunting. Am J Forensic Med Pathol 8(2):112–119
12. Carter GL (1989) Accidental firearm fatalities and injuries among recreational hunters. Ann Emerg Med 18:406–409
13. Demirci S, Gunaydin G, Dogan KH, Erkol Z (2008) Deaths caused by mole guns: three case reports. Int J Leg Med 122:323–325
14. Janssen W, Miyaishi S, Koops E, Hildebrand E, Püschel K (1996) Gunshot fatalities in connection with hunting and hunting rifles. Causes, prevention and expert evaluation. Arch Kriminol 197: 1–15
15. Karger B, Billeb E, Koops E (2002) Accidental firearms fatalities. Forensic and preventive implications. Int J Leg Med 116:350–353
16. Sellier K (1986) Death: accident or suicide by use of firearms. Forensic Sci Prog 1:91–115
17. Rouse D, Dunn L (1992) Firearm fatalities. Forensic Sci Int 56:59–64
18. Karger B, Wissmann F, Gerlach D, Brinckmann B (1996) Firearms fatalities and injuries from hunting accidents in Germany. Int J Leg Med 108:252–255
19. Cina SJ, Ward ME, Hopkins MA, Nichols CA (1999) Multifactorial analysis of firearm wounds to the head with attention to anatomic location. Am J Forensic Med Pathol 20:109–115
20. Smith JL, Wood GC, Lengerich EJ (2005) Hunting related shooting incidents in Pennsylvania, 1987–1999. J Trauma 58:582–590
21. Haag LC (2007) Wound production by ricocheted and destabilized bullets. Am J Forensic Med Pathol 28:4–12
22. Schyma C, Placidi P (1997) Traces of ricocheted action safety bullets. Am J Forensic Med Pathol 18:15–20
23. Karger B, Kneubuehl BP (1996) On the physics of momentum in ballistics: can the human body be displaced or knocked down by a small arms projectile? Int J Legal Med 109:147–149
24. Rutty GN, Boyce P, Robinson CE, Jeffery AJ, Morgan B (2008) The role of computed tomography in terminal ballistic analysis. Int J Legal Med 122:1–5