



Case Report

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A Delayed Death due to an Accidental Bullet Brain Injury Initially Mistaken for a Blunt Trauma The Importance of Good Practice in Forensic Medicine



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Abstract

A seventy-one-year-old woman was found to the ground of her bedroom, in a pool of blood; she was immediately rescued and taken to the Emergency Room where she appeared alert and aware. She explained to doctor that she had fallen spontaneously, wounding so her head. The lady, after this aware brief interaction, soon died. Based on woman's statements, the death was classified as accidental. However, the prosecutor ordered a forensic evaluation, as required by the recommendations of the Committee of European Union ministers, and found the lady had a brain injury due to gunshot. After long investigation the truth came out: while cleaning his gun, a man exploded unintentionally a shot towards a building near his home, killing so his neighbor. Due to the unexpected and sudden hit of the head by the bullet, the women did not understand what happened and reported only the fall misleading the emergency responders to the incidental nature of the trauma. This case report emphasizes the importance to perform the autopsy findings in all cases of death that could have an unnatural cause, as recommended by the international autopsy judicial guidelines.

Keywords: Stray Bullet; Firearms; Brain Injury; Guidelines; Unnatural Death; Death Investigation

Introduction

There is a global increase in unintended firearm injuries from Europe to America, UK and Asia [1]. In some countries like Pakistan [2], Iran [3] and India [4] public uprising, protests and aggressive mobs are commonly controlled by using force and aerial firing is a well known tool used by administrative bodies to disperse the aggressive mobs. In general numerous factors play a role in the overall incidence of stray bullet injuries such as an undue and inappropriate use of guns, an undue public exposure of weapons or an inadequate maintenance and custody [5]. In some countries there is an additional factor due to tradition of celebrating the marriage ceremonies or the birth of a male child by way of opening aerial fires [2,6,7]. Wintemute et al. [8]

carried out a survey in USA that showed that 317 persons were injured by stray bullets in a year, of whom 65 (20.5%) died. The issue of stray bullet injuries is very important and widespread, but very often overlooked and so poorly studied. The case object of our report fits into this perspective.

Case Report

A 71-year-old woman was found lying on the floor in her bedroom, near the window. She was supine, with the head turned to the left in a pool of blood. Her relatives immediately alerted the emergency staff. The woman was conscious and responsive, and stated to her relatives and the emergency staff

that she had fallen to the ground and beaten her head. After all she proved to be cooperative; her pupils were isocyclic and normally reactive. Yet, she had two severely bleeding wounds on her forehead. In a matter of time she died with the diagnosis of hemorrhagic shock due to dual wound to the forehead. The doctors suspected that she might have fallen hitting her head, because of an illness or a stumble. After the entire woman suffered from frequent dizziness and in the previous months she already injured herself due to this problem. Classifying the death was accidental seemed the most logical diagnosis. Yet, not everyone shared the same opinion and the Prosecutor ordered a routine medico-legal evaluation. Just 24 hours later a forensic examination was performed revealing an unexpected situation.

The External study of the body showed two skin and bone injuries in the right and left fronto-temporo-parietal regions, while a pre-autopsy skull X-rays highlighted multiple bilateral fronto-temporal fractures and bilateral frontal small bone fragments and continuous solutions. But the real clue came from the internal examination. A U-shaped notch with the concavity facing upwards, with black bony edges clearly emerged in the

left frontal region of the skull. Such lesion was fully compatible with the entrance hole of a single bullet, 0.9 cm of diameter. Computed tomography and magnetic resonance imaging of the brain (Figure 1) confirmed the evidence of multiple bony fragments in both the left frontal lobe (mainly in the basal portion) and, in a lesser number, in the contra lateral one, as well as subarachnoid, intra-axial, and intraventricular hemorrhage, in both the frontal lobes with predominance in the left one. The gross examination of the brain showed a wide subarachnoid hemorrhage at the frontal and parietal lobes. In the apical part of the left frontal lobe, there was an area of laceration with a depth of about 4 cm and the proximal cerebral tissue had multiple hemorrhagic dotting. The initial hypothesis of an accidental fall was feasible anymore. Only a gunshot could have caused that wound. In fact further investigation carried out by the Police led to the discovery of a bullet hole in the shutter even if the bullet was never found. But, after an extensive inquiry, the truth came out. The woman's neighbor had fired an unintentional shot while cleaning his gun. The unlikely woman just happened to be on the wrong spot at the wrong time.

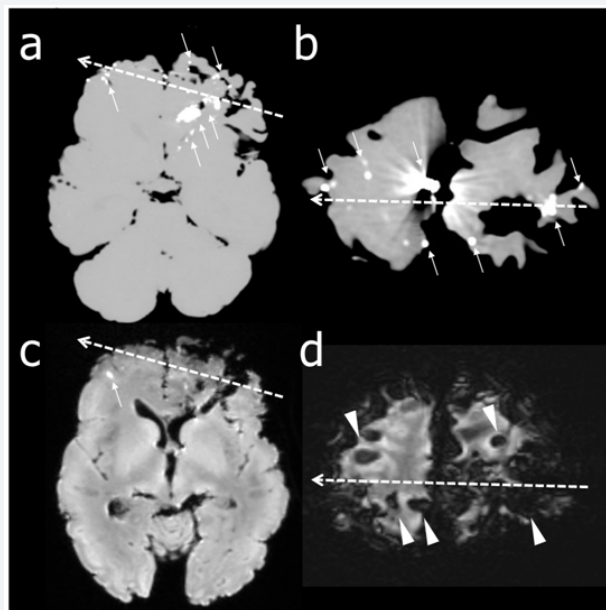


Figure 1.

Discussion and Conclusion

Notably, nowadays postmortem neuroradiology is a well established advance and help in forensic cranio-encephalic pathology [9]. In fact, in the case presented herein, the association of autopsy with postmortem skull X-rays and brain CT and MRI showed that the cause of death was due to a gunshot wound from a single bullet. Thus allowed to exclude the initial hypothesis of an accidental death. It was a single bullet, of the approximate diameter of about 0.9 cm, which hit the woman at the left frontal region. The shot direction was from left to right

and with an almost horizontal course, i.e. slightly from bottom to top. The projectile entered the cranium and the brain surface of the frontal lobes and passed just above the base of the skull. Then, it left at the right frontal region, after having provoked a complex fracture of the cranial bones of the plateau. The injury didn't cause an immediate death; on the contrary, after the shot, the woman was conscious and responsive and had interaction with relatives and doctors.

The passage of the bullet did not bring an immediate death of the subject, since there was only a small area of loss of cerebral

substance in the lower face of the left frontal lobe. Anyway it was not susceptible to any medical and surgical treatment, and it prevented the medical staff from saving the victim's life. Death occurred only after a short time, because of cerebral hemorrhage. Brain functional anatomy explains the fact that the subject, once hit by the bullet, was able to talk with the people who came to aid her. Actually, after the famous case of Phineas Gage [10,11], many cases of non-lethal brain injuries have been reported in the literature [12-14]. The data in the literature show the need to adopt stricter rules on the possession and use of firearms. Particularly in those countries where legislation allows with relative ease to own a firearm, we should adopt more stringent measures governing the use and custody. Last but not least, this seemingly simple case emphasizes the importance to perform the autopsy findings in all cases of death that could have an unnatural cause, violent or in suspicious circumstances, as recommended by the international autopsy judicial guidelines [15-17].

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