Case Letter

A rare cause of foot drop: Tired bullet

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Dear editor,

In some communities, the using of firearms during the celebrations have become a traditional behaviour. Injuries with free falling bullets that named “tired bullet” are increasing in accordance with the increased uncontrolled using of firearms. In the literature, serious disabilities and even deaths have been reported as a result of this rare injuries. We present a patient injured due to tired bullet with foot weakness and headache.

CASE

A fifteen-year-old male patient with complaints of headache and left foot weakness was brought to emergency room. During the examination, his measured blood pressure was 100/60 mmHg, heart rate 75 per minute, and oxygen saturation 99%. The patient's Glasgow Coma Scale was evaluated as 15 points. The patient developed a headache after an object hitting to his head, while walking on the sidewalk about six hours before emergency room admission. After 1 hour of injury the patient developed numbness and loss of power in left foot which was gradually increasing.

During the examination of head, there was a hyperemic lesion of 0.5 centimeters diameter in a circular view with irregular edge, near the right parieto-occipital suture and at a distance of approximately 1 centimeters of the sagittal suture. There was no burning, blacking and tattooing around the wound. External examination of the whole body showed no signs of another injury. All of the systemic examination was normal but weaknesses of the left knee and ankle flexion and toe dorsiflexion without sensory loss were only positive signs in the neurological examination. The power of left ankle dorsiflexion and left toe was grade 1/5 and positive Babinski's sign, hyper-reflexia in left deep tendon reflex were noted.

Additionally peripheral pulses were detectable. In computerized tomography (CT) imaging of the patient, there was a intact bullet in the same area with skin lesion that penetrated brain parenchyma and caused a minimal contusion just under the bone (Figure 1).

Blood samples were taken for hemogram, biochemistry, coagulation parameters, and blood type analyzes. Tetanus prophylaxis, antibiotherapy and fluid resuscitation were applied and a consultation was requested from a brain surgeon. Finally the patient was admitted to the neurosurgery clinic. The value of Glasgow Coma Scale was not changed during emergency room management. After two weeks of surgery, we did a telephone interview with the patient, he complained of left leg numbness and partial dorsiflexion limitation.

DISCUSSION

Along with an increase in individual armament, uncontrolled using of firearms in social events such as newyear, childbirth, victory and wedding party, has become a progressive and important public threat.

[1] In stray shooting to air, the bullet loses its energy and makes free falling motion, injuries related to this movement of the bullet are rare and referred to as tired

Figure 1. The computerized tomography (CT) imaging of patient. There was a intact bullet in the same area with skin lesion that penetrated brain parenchyma and caused a minimal contusion just under the bone.

bullet or falling bullet injuries.^[2] In the literature, there are several case reports of chest, heart and limb injuries due to tired bullets, but the number of reports related to head injuries are limited.^[3–5] However, Ordog and colleagues investigated 118 patients that had tired bullet injuries. In this study, they found head (77%–36%) and shoulder (12%–18%) were the most affected areas. In addition, mortality rate was reported as 32%.^[6] In an experimental study made by Ögünç et al^[7] gunshots made from different angles with different diameters of bullets, and possibility of injuries due to free falling bullets were investigated. They found total kinetic energy values of bullets that 9×19 mm and 7.65×17 mm in diameter, could penetrate skin and flat bones. In addition, they found 65 falling tired bullet injury cases between 2000 and 2012 years in Turkey, 27 of these patients died and the mortality rate was calculated as 41.5% in such injuries. In accordance with the results of these studies, we determined an intact bullet that penetrated to brain parenchyma just under the right parietal bone of the head. In a study by Özdemir and colleagues, a 8-year-old female patient who had a frontal head gunshot wound during a wedding party was investigated. In this report, the tired bullet movement along with the brain and spinal canal was investigated. Unlike to our study, entrance of bullet was frontal region of the head and the path that the bullet travels was quite long.^[8] In our study, bullet had entered the top of head at an angle of 90 degrees, and stopped just after passing through the parietal bone by losing its energy. It caused a mild contusion in the brain parenchyma. The extent of trauma in this type of injury depends on the type, kinetic energy and mass of bullets and the location of the injury area.^[9]

Most prominent complaint of the patient was left foot numbness and weakness in our study, and power of left toe was grade 1/5 in neurological examination. Acute foot drop is a result of anterior tibialis muscle weakness and usually caused by peripheral nerve lesions and lumbar disc herniations.^[10] Primary brain tumors and masses which are commonly at parasagittal location and affecting the pyramidal tract may result in foot drop.^[11] In the literature, there are many case reports about foot drop that develops in relation with some lesions such as parasagittal located brain abscess, and meningioma.^[12,13] And also there are many reports of foot drop that develops with trauma. In a study by Kang and colleagues,^[14] they reported a 49-year-old male patient with head trauma due to falling from height and foot drop presented. Like to our study, neurological examination of patient was normal except for foot drop

in this study. In the CT imaging of the patient, there was a sagittal suture fracture and hemorrhagic contusion in the left premotor area. In an another study by Atac and colleagues,^[15] a 21-year-old male patient was presented. There was a superficial firearm injury at right parasagittal area of the head and the left foot dorsiflexion limitation was developed nearly 24 hours after the event. In the CT imaging of the head, there was a hemorrhagic contusion in parasagittal area of the right parietal lobe. Similarly to these reports, there was a bullet injury and minimal contusion in right parasagittal area of the brain in our study. Left foot drop was developed depending on these lesions.

CONCLUSION

To prevent this type of injuries, which may cause morbidity and mortality, individual arming and uncontrolled use of firearms should be limited. Additionally, in the cases of acute foot drop, falling tired bullet injuries should be kept in mind, because the possibility of injury around the parasagittal area is quite high in such injuries.

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REFERENCES

- 1 Yücel MT. Ateşli Silahlarla Mücadelede Teorik Yaklaşımlar. TBB Derg. 2005;59:49-62.
- 2 Rapkiewicz AV, Shuman MJ, Hutchins KD. Fatal wounds sustained from “falling bullets” maintaining a high index of suspicion in a forensic setting. J Forensic Sci. 2014;59(1):268-70.
- 3 Incorvaia AN, Poulos DM, Jones RN, Tschirhart JM. Can a falling bullet be lethal at terminal velocity? Cardiac injury caused by a celebratory bullet. Ann Thorac Surg. 2007;83(1):283-4.
- 4 Sharma DK, Tomar S. The stray bullet. Forensic Res Criminol Int J. 2015;1(1):00006.
- 5 Das K, Karateke F, Onel S, Ozkaya M, Okten AI, Aziret M, et al. Can tired bullets cause serious injuries? A case report and review of the literature. Injury. 2013;44(1):144-5.
- 6 Ordog GJ, Dornhoffer P, Ackroyd G, Wasserberger J, Bishop M, Shoemaker W, et al. Spent bullets and their injuries: the result of firing weapons into the sky. J Trauma. 1994;37(6):1003-6.
- 7 Ögünç Gİ, Özer MT, Çoşkun K, Eryılmaz M, Uzar AI. The wounding potential of free-falling bullets. Ulus Travma Acil Cerr Derg. 2013;19(5):392-7.

- 8 Özdemir M, Unlu A. Gunshot injuries due to celebratory gunshooting. *Turk Neurosurg.* 2009;19(1):73-6.
- 9 Maiden N. Ballistics reviews: mechanisms of bullet wound trauma. *Forensic Sci Med Pathol.* 2009;5(3):204-9.
- 10 Tokuhashi Y, Matsuzaki H, Uematsu Y, Oda H. Symptoms of thoraco lumbar junction disc herniation. *Spine (Phila Pa 1976).* 2001;26(22):E512-8.
- 11 Westhout FD, Pare LS, Linskey ME. Central causes of footdrop: rare and under appreciated differentia ldiagnoses. *J Spinal Cord Med.* 2007;30(1):62-6.
- 12 Eskandary H, Hamzei A, Yasamy MY. Foot drop following brain lesion. *Surg Neurol.* 1995;43(1):89-90.
- 13 Özdemir N, Citak G, Acar UD: Spastik foot drop caused by a brain tumor: A case report. *Br J Neurosurg.* 2004;18(3):314-15.
- 14 Kang MS, Youm JY, Choi SW, Kim SH, Koh HS, Song SH, et al. Foot drop caused by a focal brain injury. *J Kor Neroltraumatol Soc.* 2005;1(1):118-21.
- 15 Atac K, Ulaş UH, Erdogan H, Gokcil Z. Foot drop due to cranial gunshot wound. *Mil Med.* 2004;169(7):568-9.

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