

Gunshot Injury of Head and Neck Region with an Atypical Bullet Trajectory: The Importance of Whole Body Computed Tomography Scan

Yusuf Velioglu¹, Ahmet Yuksel², and Baris Durgun³

ABSTRACT

Nowadays, gunshot injuries have become a common medical-legal issue because of easy accessibility of firearms. Gunshot injuries of head and neck region are highly morbid and fatal, particularly when they affect vital organs. In rare cases, atypical tract lines resulting from such injuries can cause difficulties in the diagnosis and treatment. In this report, a high energy gunshot injury involving head and neck region with an atypical bullet trajectory is presented. A 24-year male soldier was brought to the emergency department on account of gunshot injury following a conflict. Although the entrance and exit holes of bullets were confined to head and neck region, the whole body computed tomography scan was carried out in spite of his borderline hemodynamics. Whole body computed tomography revealed massive hemopneumothorax, mediastinal shift, hepatic laceration, and foreign body (bullet) in the liver. The patient was operated successfully by a multidisciplinary surgical team on emergency basis. This report highlights the necessity and importance of whole body computed tomography scan in such cases.

Key Words: Gunshot injury. Atypical trajectory. Head and neck. Whole body computed tomography.

INTRODUCTION

Nowadays, gunshot injuries (GIs) have become a major global public-health issue because of their significant mortality and morbidity, long-standing physical, mental, psychological and economical disability of individuals, families, communities and countries.¹ While homicide and suicide are the main reasons of GIs, these may also be related to accidental events in rare cases. GIs involving head and neck are highly morbid and fatal conditions, especially when they affect vital organs like brain, spinal cord, trachea, and major vessels.^{2,3} However, in rare cases, atypical tract lines resulting from such injuries may lead to difficulties in diagnosis and treatment.

In this report, a case of high energy GI of head and neck with an unusual bullet trajectory is presented, and it is focused on the importance of whole body computed tomography (WBCT) scan in such cases.

CASE REPORT

A 24-year male soldier was admitted to emergency department with a high energy GI of head and neck



Figure 1: Firearm entrance and exit holes in the head and neck region of the patient.

region following a conflict. The patient was unconscious, had a superficial breathing (16 per minute) and filiform pulse (145 per minute) with an arterial blood pressure of 55/30 mmHg at the time of admission. He was intubated and resuscitated on an emergency basis. In his physical examination, firearm entrance and exit holes in the right maxillary and mandibular regions as well as another entrance hole in the right supraclavicular area were observed (Figure 1).

Except for these, there were no any other firearm entrance or exit holes on his body surface. A quick bedside abdominal ultrasonography was performed during the initial evaluation, and no free fluid was observed in the abdominal cavity. The patient received WBCT scan quickly, once an arterial blood pressure of 70/50 mmHg was attained with intensive fluid replacement. WBCT scan revealed massive right hemopneumothorax and mediastinal shift in the thoracic area, and hepatic laceration and foreign body (bullet) in the liver (Figure 2). He was transferred to operating room immediately. Firstly, urgent right tube thoracostomy was done. Afterwards, right neck exploration was done, and injured and bleeding right external jugular vein was ligated. Lastly, an exploratory laparotomy was performed, and approximately 500 mL of intra-abdominal hemorrhagic

¹ Department of Cardiovascular Surgery, Abant Izzet Baysal University Faculty of Medicine, Bolu, Turkey.

² Department of Cardiovascular Surgery, Bursa State Hospital, Bursa, Turkey.

³ Department of Cardiovascular Surgery, Gulhane Education and Research Hospital, Ankara, Turkey.

Correspondence: Dr. Yusuf Velioglu, Department of Cardiovascular Surgery, Abant Izzet Baysal University Faculty of Medicine, Golkoy Campus, 14280, Bolu, Turkey.
E-mail: yusufvelioglu@gmail.com

Received: February 10, 2018; Accepted: March 24, 2018.

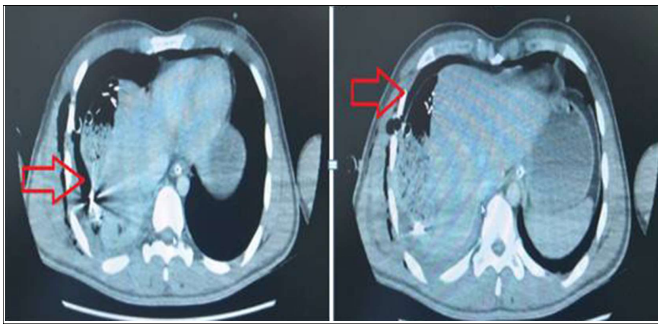


Figure 2: Computed tomography views of the patient.

fluid secondary to hepatic injury and a diaphragmatic defect were observed in the laparotomy, in which all defective and lacerated tissues were repaired. After the operation, he was transferred to intensive care unit and monitored closely. During postoperative period, general and hemodynamic status of patient was stable, and he was discharged at 13th postoperative day.

DISCUSSION

Following a GI, various factors like magnitude of energy transferred, type of bullet, distance travelled by the missile, and structures encountered before and on penetration affect the occurred extent of damage. Generally, it is known that the high energy GIs at close distance inflict most damage.⁴ On the other hand, the injured body region is a crucial parameter which determines the survival of individuals with GIs. Head and neck region involves vital organs and structures in a relatively small volume of space. Even the slightest motions of bullet of a penetrating firearm can cause severe damage on a major artery, vein and nerve simultaneously. The main reason of mortality in penetrating neck trauma is uncontrollable bleeding secondary to major vascular injury.⁵

In this report, we emphasize the potential fatal complications inherent in not examining WBCT on the basis of inspection of the patient, which is not contributory. The approach to patients with trauma is dictated by the mechanism of trauma like blunt, penetrating and blast effect, and physical examination findings elucidated on arrival of the patient in emergency room. WBCT scan has become a standard protocol and strongly recommended as a diagnostic method in patients with major trauma.⁶⁻⁸ Patients who have sustained penetrating trauma and are hemodynamically unstable are usually taken to operation. In planning

surgery, entrance and exit holes of the bullet, trajectory of the injury, and exploration of the wounds are the basic predictors; nevertheless, preoperative computed tomography (CT) scans may also be a helpful guide while considering the hemodynamics of patient. In our case, solely the inspection of entrance and exit holes could have been misleading to assume the injury is confined to head and neck region. Since the patient was exposed to a trauma with high kinetic energy, WBCT was added to the patient's evaluation. Thoracic CT findings necessitated a tube thoracostomy which has been a change in the strategy and priority of treatment; whereas, abdominal CT findings prompted emergent laparotomy which was not anticipated as a priority. Planning surgeries only on the basis of lesions of the entrance and exit of bullets and without taking in to account the probable trajectory might lead to misdiagnosis of a cascade of events that can prove mortal. Thus, we suggest WBCT scan in patients with high kinetic energy penetrating injuries.

REFERENCES

1. Kalesan B, Adhikarla C, Pressley JC, Fagan JA, Xuan Z, Siegel MB, *et al.* The hidden epidemic of firearm injury: increasing firearm injury rates during 2001-2013. *Am J Epidemiol* 2017; **185**:546-53.
2. Atturi P, Karakousis GC, Porrett PM, Kaiser LR. The surgical review – an integrated basic and clinical science study guide, 2nd edn. Lippincott Williams & Wilkins, Philadelphia, 2006.
3. Godhi S, Mittal GS, Kukreja P. Gunshot injury in the neck with an atypical bullet trajectory. *J Maxillofac Oral Surg* 2011; **10**:80-4.
4. Kakkar A, Kochhar LK. Missile injuries of face and neck: our experience. *Indian J Otolaryngol Head Neck Surg* 2000; **52**: 334-9.
5. Ongom PA, Kijjambu SC, Jombwe J. Atypical gunshot injury to the right side of the face with the bullet lodged in the carotid sheath: a case report. *J Med Case Rep* 2014; **8**:29.
6. Huber-Wagner S, Lefering R, Qvick LM, Körner M, Kay MV, Pfeifer KJ, *et al.* Effect of whole-body CT during trauma resuscitation on survival: a retrospective, multicentre study. *Lancet* 2009; **373**:1455-61.
7. Jiang L, Ma Y, Jiang S, Ye L, Zheng Z, Xu Y, *et al.* Comparison of whole-body computed tomography vs selective radiological imaging on outcomes in major trauma patients: a meta-analysis. *Scand J Trauma Resusc Emerg Med* 2014; **22**:54.
8. Caputo ND, Stahmer C, Lim G, Shah K. Whole-body computed tomographic scanning leads to better survival as opposed to selective scanning in trauma patients: a systematic review and meta-analysis. *J Trauma Acute Care Surg* 2014; **77**:534-9.

.....☆.....