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Case Report

A Gunshot to the Right Arm with Atypical Trajectory: Things are not Always as Simple as they Seem!

Elham Pishbin[1], Azadeh Mahmoudi Gharaee[2] and Hamidreza Reihani[1]*

[1]Mashhad University of Medical Sciences, Imam Reza Hospital, Daneshgah St., Mashhad, Iran

[2]Mashhad University of Medical Sciences, Taleghani Hospital, Kalantari Highway, Mashhad, Iran

***Corresponding author:** Hamidreza Reihani, Mashhad University of Medical Sciences, Imam Reza Hospital, Daneshgah St., Mashhad, Iran, Tel: +98 5138525312; E-mail: reihanihr@mums.ac.ir; h_reihani@yahoo.com

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Abstract

Gunshot wound is considered as a lethal trauma and is one of the leading causes of death in developing countries. Sometimes bullet's trajectory and the extent of consequential damages are not predictable. Here we present a gunshot injury on the right arm with the bullet lodged in the left paraspinal muscles. A 28 years old man was referred to the emergency department of a tertiary teaching hospital due to a gunshot by police. The entry wound was on the lateral side of the right arm but there was no visible exit wound. CXR revealed the bullet in the left hemithorax and Computerized tomography showed fracture of posterior elements of the seventh thoracic vertebra. Patient successfully managed non-operatively and discharged from hospital without any complications after 20 days. Physicians involved in the evaluation of multiple trauma patients, including missile injury patients should be aware of this fact that the bullet trajectory and its consequential damages may be unpredictable so trying to identify possible injuries to other organs is one of the first steps in the evaluation of gunshot patients.

Keywords

Bullet trajectory; Gunshot; Thoracic injuries

Introduction

Gunshots are among most serious injuries because of their destructive effects on all structures in their path so rapid recognition of probable damages is of the most importance in timely intervention and saving the patient's life. But bullet trajectory is not always predictable and atypical tract lines sometimes make the case to be more complicated [1]. Civilian Gunshot Injuries (GSIs) usually are considered in a distinct category with a more focal injury pattern [2]. Among all kinds of ballistic injuries, chest civilian gunshot wound is a rare injury, but it is going to be a growing problem these days [2]. In Iran, GSIs are not common because it is illegal for the citizens to own or carry a firearm. In a study by Norouzpour et al., only 66 gunshot wound patients referred to Mashhad's hospitals (from all over the province) during the one year period and the most injured body parts were extremities [3]. Here we present an interesting case of chest GSI with the entry point in the upper arm with no visible exit wound and lodgment of the bullet in the left paraspinal muscles.

Case presentation

A 28 years old man was referred to the emergency department of a tertiary teaching hospital following a GSI to his right arm. He was shot by police while running away and he was first transferred to a local hospital where management with cleaning of the wound and simple dressing were performed. The patient was then transported to our hospital (the largest referral academic hospital in the North-East of Iran affiliated to Mashhad University of medical sciences) for an orthopedic consultation.

On presentation in the emergency department, approximately 3 hours after a gunshot to his right arm, the

patient was alert complaining of severe back pain and dyspnea. Vital signs were stable. Airway was intact. Breath sounds were slightly decreased on the right side of the chest and there was some evidence of subcutaneous emphysema at the same side. There was no active bleeding. The entrance site of bullet was in the mid lateral of the right arm but there was no evidence of an exit wound (Figure 1a).

Figure 1a: Entrance wound of the bullet in right mid lateral arm.

Focused Assessment with Sonography for Trauma (FAST) revealed significant pleural effusion in right hemi thorax. Portable chest radiograph was done as a part of primary survey, which revealed the bullet in the left hemi thorax, haziness on the right side of the chest and also evidence of pneumopericardium (Figure 1b).

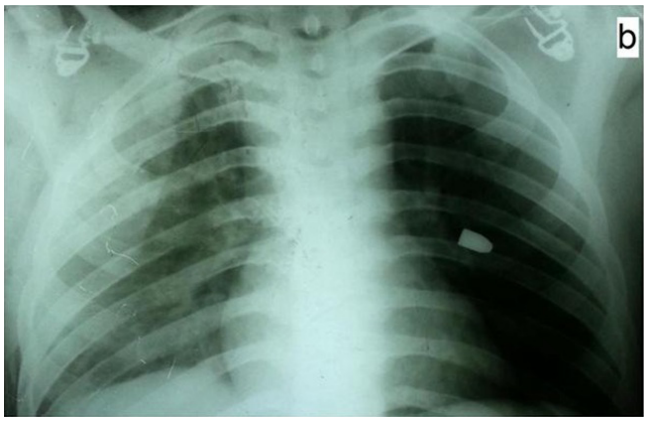

Figure 1b: Chest X ray PA, the bullet is seen in left hemi thorax.

A chest tube was inserted at the right side, 450 cc of blood was withdrawn and the patient feels better

Upon more detailed physical examination on secondary survey, he had complaint of numbness of his lower limbs with Sensory level at the level of the tenth thoracic vertebra. Computerized Tomography (CT) which often demonstrate the extent of injuries, delineate the trajectory of the bullet in mediastinal injuries and also considered the study of choice in GSIs to the spine [2,4], was performed in the emergency department. CT revealed the fracture of spinous process and posterior elements of the 7th thoracic vertebra (Figures 2b and c) and the bullet lodged in paravertebral muscles at the level of T9 (Figure 2a).

Figure 2: a: Coronal section of thoracic vertebrae CT, showing the bullet in paravertebral muscles at the level of T9; b: Axial section of T7 CT, showing T7 posterior element fracture, and c: Sagital section of thoracic vertebrae CT, showing T7 posterior element fracture.

There was no evidence of spinal instability and no evidence of visceral injuries.

The patient admitted to the Intensive Care Unit (ICU) after 7 hours. CT myelogram was performed and the spinal cord was intact. Neurosurgery consultant did not recommend emergent intervention for spinal injury. Because mediastinal injuries were suspected, other complementary investigations, including angiography, esophagoscopy and bronchoscopy were done. No significant injuries to the vessels and aerodigestive system were discovered.

The patient was managed successfully without a surgery. He fully recovered from all injuries and discharged from hospital with no complication after 20 days.

Discussion

In recent years, new evidence on effective treatment of patients with gunshot wounds has come from military settings and is being adapted for civilian emergency departments [5]. The most common life threatening injuries of the thorax are hemothorax, pneumothorax and pericardial tamponade that should be treated immediately [6]. The most important therapeutic intervention is chest tube insertion [7]. Focused

Assessment with Sonography for Trauma (FAST) in such patients is helpful to determine tamponade [8].

Missile injuries are generally described as penetrating (resulting from low velocity projectiles embedded deeply in tissues, with a small entry), perforating (resulting from high velocity projectiles with small entry wound and large exit wound), avulsing (resulting from shotgun pellets at median velocity with massive tissue destruction) [9].

In this case, the GSI resulted in a penetrating wound with the evidence of the bullet entry at the mid lateral of the right arm and its lodgment in the paraspinal muscles. It seems that the most probable trajectory of the bullet was through the arm muscles upwards toward the shoulder and then through the right hemithorax toward the vertebral column, fracturing the posterior elements of the 7th thoracic vertebra and lodged in the left paravertebral muscles at the level of 9th thoracic vertebra.

In the literature there are examples of bullets with atypical trajectory or bullets with no exit wounds which are lodged in deep tissues for the lifetime of the patient. George Dimitroulis presented an interesting case of GSI to the back with the bullet lodged at the back of maxilla asymptomatic for 10 years [10]. Since the risk of lead poisoning is low in the case of low-velocity projectiles which are embedding in the soft tissue, it is recommended that bullets be left in situ unless projectiles can be palpated subcutaneously [2]. Risk of lead intoxication from GSI to the spine is also rare unless the bullet is located near facet joints or intervertebral discs [4]. In our case the bullet was left in place because it was embedded in the paraspinal soft tissue, away from facet joints and not palpated subcutaneously.

During ICU admission, the results of all pertinent investigations were unremarkable. Given the patient to be stable clinically and sensory disturbances improved, the patient was successfully managed non-operatively. Literature shows that a large number of GSIs can be managed successfully without explorative thoracotomy [11]. Spinal gunshot injuries are usually not immediately life threatening. Many patients could be treated conservatively, unless unstable injuries [2]. There are few reports of thoracic GSIs in the literature in which the bullet trajectory predicts serious injury but the patient is stable clinically and treated conservatively [12]. Estimation of bullet trajectory cannot always be true and determination of the real injury needs more investigation [13]. Penetrating gunshots could damage all structures in their path so should be considered an imminent threat to the patient's life unless prove otherwise [12]. Proximal of upper extremity and shoulder gunshot wounds should not be neglected and never considered as an isolated trauma; Chest examination should be done carefully to rule out serious injuries [11].

References

1. Robin-Lersundi A, Trancho FH, Gastardi JC, Martinez AG, García AT, et al. (2003) Penetrating chest gunshot wounds: conservative treatment. Surg Endosc 17: 1677.
2. Lichte P, Oberbeck R, Binnebösel M, Wildenauer R, Pape HC, et al. (2010) A civilian perspective on ballistic trauma and gunshot injuries. Scand J Trauma Resusc Emerg Med 18: 35.
3. Norouzpour A, Khoshdel AR, Modaghegh MH, Kazemzadeh GH (2013) Prehospital Management of Gunshot Patients at Major Trauma Care Centers: Exploring the Gaps in Patient Care. Trauma Mon 18: 62-66.
4. Moon E, Kondrashov D, Hannibal M, Hsu K, Zucherman J (2008) Gunshot wounds to the spine: literature review and report on a migratory intrathecal bullet. Am J Orthop 37: 47-51.
5. Bruner D, Gustafson CG, Visintainer C (2011) Ballistic injuries in the emergency department. Emerg Med Pract 13: 1-30.
6. American College of Surgeons. Committee on Trauma (2008) ATLS: Advanced Trauma Life Support for Doctors: Student Course Manual. American College of Surgeons, Chicago, IL, USA.
7. Meyer DM (2007) Hemothorax related to trauma. Thorac Surg Clin 17: 47-55.
8. Plummer D (1989) Principles of emergency ultrasound and echocardiography. Ann Emerg Med 18: 1291-1297.
9. Ongom PA, Kijjambu SC, Jombwe J (2014) 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 8: 29.
10. Dimitroulis G (2006) An unusual bullet trajectory to the face. J Oral Maxillofac Surg 64: 137-139.
11. Bastos R, Baisden CE, Harker L, Calhoon JH (2008) Penetrating thoracic trauma. Semin Thorac Cardiovasc Surg 20: 19-25.
12. Khan MS, Khan BM, Naz S, Pirzada MT (2013) Is estimated bullet trajectory a reliable predictor of severe injury? Case report of a thoraco- abdominal gunshot with a protracted trajectory managed nonoperatively. BMC Res Notes 6: 63.
13. Aygün M, Tulay CM (2014) [Atypical trajectory of gunshot injury]. Ulus Travma Acil Cerrahi Derg 20: 452-454.