

Penetrating Nail Injury between Os Occipitale and the First Cervical Vertebra: Case Report

Birinci Servikal Omurga ve Oksipital Kemik Arasında Görülen Delici Çivi Yaralanması: Olgu Sunumu

Havva Şahin¹, O. Faruk Türkoğlu², Timur Yıldırım², Müge Sönmez¹

¹Department of Emergency, Atatürk Training and Research Hospital, Ankara, Turkey

²Department of Neurosurgery, Atatürk Training and Research Hospital, Ankara, Turkey

Abstract

Spinal cord injuries are the most devastating of all trauma-related injuries. Penetrating cervical spinal cord injuries are seen rarely. Due to the damage to neural structures, these injuries are associated with significant morbidity. The majority of penetrating injuries are caused by gunshot wounds. Stabbing injuries caused by knives, screwdrivers, glass fragments and nails are much less common. The primary concern in managing penetrating neck injuries is control of bleeding and airway management. In this case report we described an unusual case of accidental nail injury occurring in a man who sustained a penetrating neck injury with a nail lodged between the os occipitale and the first cervical vertebra which caused incomplete spinal injury. (*JAEM 2012; 11: 185-7*)

Key words: Cervical vertebra, penetrating injury, spinal cord

Özet

Spinal kord yaralanmaları tüm travma ilişkili yaralanmaların en yıkıcı olanları arasında yer almaktadır. Delici servikal spinal kord yaralanmaları ise daha nadir görülmektedir. Nöral yapıların hasarına bağlı olarak bu tip yaralanmalar belirgin morbidite gösterirler. Delici yaralanmaların çoğunluğu ateşli silahlar ile olmaktadır. Bıçak, tornavida, cam parçaları ve çivilerle olan delici yaralanmalar ise daha az sıklıkla görülmektedir. Delici yaralanmaların yönetiminde ilk dikkat edilecek olan havayolunun açıklığının sağlanması ve kanama kontrolüdür. Biz bu olgu sunumunda alışılmamış bir kaza sonucu gerçekleşmiş birinci servikal vertebra ile oksipital kemik arasına penetre olan ve inkomplet spinal hasara neden olan delici yaralanma şekline bağlı bir olguyu rapor etmek istedik. (*JAEM 2012; 11: 185-7*)

Anahtar kelimeler: Servikal omurga, delici yaralanma, spinal kord

Introduction

Spinal cord injuries (SCI) are the most devastating of all trauma-related injuries. SCI is predominantly a disease of young men. The majority of penetrating injuries are caused by gunshot wounds. Stabbing injuries caused by knives, screwdrivers, glass fragments and nails are much less common (1). In this report we presented an injury type which occurred in a young man with a nail lodged between the os cranium and the first cervical vertebra.

Case Report

A 19-year-old construction worker was brought to our emergency department. While he was working, the guide rope attached between two nails became untied. One of the nails was pulled free, gained momentum and stuck into the cranium from the left superior side of

os occipitale (Figure 1). He fell and his coworkers brought him to the emergency department themselves 30 minutes after the accident. He was fully conscious and cooperative but complaining that he could not move his left upper extremity. The wound was not bleeding and there were no signs of hematoma, crepitation or bruit. His hemodynamic situation was stable. The blood pressure was 110/70 mmHg, pulse was 88/minute and the respiratory examination was normal. Neurologic examination revealed 1/5-2/5 motor function of the left upper extremity and 3/5 motor function of the left lower extremity. There was no sensory loss. The left pupilla was miotic.

Cervical radiography showed the nail lodged between the os occipitale and the first cervical vertebra (Figure 2). Brain and cervical tomography (CT) (Figure 3) showed that the nail was spanning from the left occipitale and left side of C1 vertebra posterior arcus to the spinal cord. The end of the nail was in contact with the left side of the spinal cord but there were no signs of hemorrhage.

Correspondence to / Yazışma Adresi: Timur Yıldırım, Department of Neurosurgery, Ankara Atatürk Training and Research Hospital, Bilkent Yolu No:3, Bilkent, Ankara, Turkey Phone: +90 312 291 25 00 - 3250 e.mail: mdtimur@hotmail.com

Received / Geliş Tarihi: 29.07.2009 **Accepted / Kabul Tarihi:** 08.12.2009

©Copyright 2012 by Emergency Physicians Association of Turkey - Available on-line at www.akademikaciltip.com

©Telif Hakkı 2012 Acil Tıp Uzmanları Derneği - Makale metnine www.akademikaciltip.com web sayfasından ulaşılabilir.

doi:10.5152/jaem.2011.055



Figure 1. Anteroposterior skull radiography shows the location of nail on the left side



Figure 2. Lateral cervical radiography showing the nail settled between os occipitale and the first cervical vertebra



Figure 3. Axial cervical tomography showing the nail spanning from left occipital condyle and left posterior arcus of first cervical vertebra to the spinal cord



Figure 4. Direct image of the penetrating injury

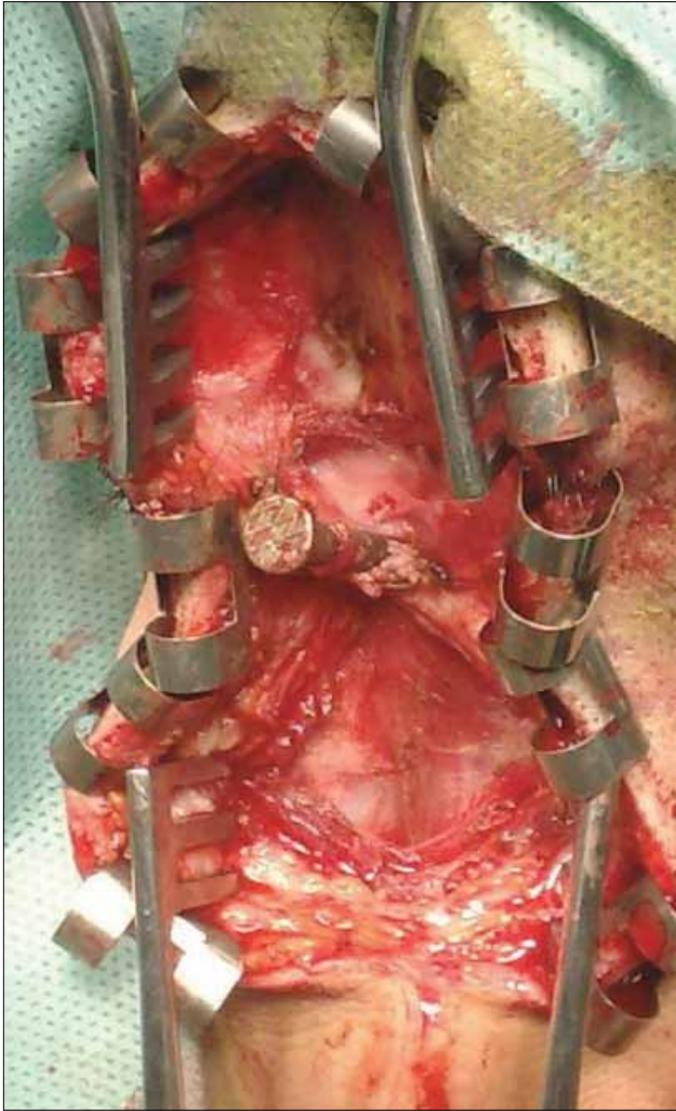


Figure 5. The dissection of tissues during the surgical procedure

30 mg/kg bolus methylprednisolone was administered intravenously (iv) over 15 minutes and then continued with 5.4 mg/kg/h infusion. Tetanus prophylaxis was administered. The patient received broad-spectrum antibiotic therapy and was prepared for prompt surgery because of the progressive neurological deficits. With a sitting surgical position, a vertical skin incision was made from the left side of the median line including the lodged nail, which lay between the occipital bone and C1 vertebra. All the structures from the skin to the nail were dissected to isolate the nail from the tissues (Figure 4, 5). The nail was located between the occipital bone and C1 vertebra arcus. The muscles were dissected from the C1 vertebra arcus on the left side and there was no vascular damage including the left vertebral artery or any bone defects. The nail was grasped with surgical pliers and gentle movements were performed to loosen the nail, then the nail was pulled out. It was 78 mm long. Cerebrospinal fluid leakage was seen from the hole in the damaged occipitocervical membrane. The membrane was dissected and fibrin tissue sealant system applied after the watertight closure of the damaged dura. During the recovery period after the operation, the 1/5-2/5 motor function of left extremity improved to plus 4/5 motor function in the 5th. day of the postop-

erative period. In the third month of the postoperative period the patient's motor function was normal. No meningitis or any other complications were seen.

Discussion

Spinal cord injuries are the most devastating of all trauma-related injuries. SCI is predominantly a disease of young men. The mean age has been reported as 33.5 years and the male/female ratio is 4 to 1. 90 percent of cases are caused by blunt trauma with most of these from motor vehicle crashes. The majority of penetrating injuries are caused by gunshot wounds. Stabbing injuries caused by knives, screwdrivers, glass fragments and nails are much less common (1).

The primary concern in managing penetrating neck injuries is control of bleeding (2-5) and airway management (3, 6). Airway management of patients after a penetrating neck trauma is a major concern, particularly if there is involvement of the occipital-atlantoaxial complex (7, 8). The leading cause of death in penetrating neck trauma is vascular injury (9). Patients with active bleeding, expanding hematoma, or neurological abnormalities should undergo prompt surgery (10). Because of the neurological deficits we performed prompt surgery in our patient.

Conclusion

Penetrating injuries of the cervical spine are mainly caused by gunshots, sharp objects, screwdrivers or similar mechanisms. However, nail injuries are mostly caused by high pressure pneumatic equipment like nail guns, but it is very rare to see injuries as we encountered in our case here, caused by the drilling damage of a nail as a result of momentum conducted to the nail by application of high tension to a string combining two nails to each other. This case illustrates an uncommon nature and mechanism of injury and this is the second case in the literature which was caused by such a mechanism.

Conflict of Interest

No conflict of interest was declared by the authors.

References

1. Baron BJ, Scalea TM. Spinal Cord Injuries. Tintinalli JE, Kelen GD, Stapczynski JS (ed): Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 6th ed. McGraw-Hill: New York, 2004; section 22, chapter 256.
2. Asensio JA, Valenzio CP, Falcone RE, Grosh JD: Management of penetrating neck injuries. The controversy surrounding zone 2 injuries. Surg Clin North Am 1991; 71:267-96.
3. Eggen JT, Jordan RC: Airway management, penetrating neck trauma. J Emerg Med 1993; 11:381-5. [\[CrossRef\]](#)
4. Ordog GJ, Albin D, Wasseberger J, Schlatter TL, Balasubramanian S: 110 bullet wounds to the neck. J Trauma 1985; 25:238-46. [\[CrossRef\]](#)
5. Roon AJ, Christnesen N: Evaluation and treatment of penetrating cervical injuries. J Trauma 1979 Jun; 19(6): 391-7. [\[CrossRef\]](#)
6. Nemzek WR, Hecht ST, Donald PJ, McFall RA, Poirier VC: Prediction of major vascular injury in patients with gunshot wounds to the neck. AJNR Am J Neuroradiol 1996; 17:161-7.
7. Criswell JC, Parr MJA. Emergency airway management in patients with cervical spine injuries. Anaesthesia 1994; 49:900-3. [\[CrossRef\]](#)
8. Shearer VE, Giesecke AH. Airway management for patients with neck trauma: a retrospective study. Anesth Analg 1993; 77:1135-8. [\[CrossRef\]](#)
9. Biffi WL, Moore EE, Rehse DH, Offner PJ, Franciose RJ, Burch JM: Selective management of penetrating neck trauma based on cervical level of injury. Am J Surg 1991; 174:678-82. [\[CrossRef\]](#)
10. Ofer A, Nitecki SS, Braun J, Daitschman M, Goldsher D, Hoffman A, Engel A: CT angiography of the carotid arteries in trauma to the neck. Eur J Vasc Endovasc Surg 2001; 21:401-7. [\[CrossRef\]](#)