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

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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

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.

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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 occipitale and left posterior arcus of first cervical vertebra to the spinal cord.

Figure 4. Direct image of the penetrating injury.
30 mg/kg bolus metilprednisolone 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 postoperative 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