

CASE REPORT / OLGU BİLDİRİSİ

Contralateral profound hearing loss after head trauma: A case report

Ö. Sakallıoğlu, C. Polat, E. Soylu, İ. Orhan, H. B. Altınsoy

Kafa travması sonrası karşı kulakta ileri derecede işitme kaybı: olgu sunumu

Kafa travması sonrasında işitme kaybı görülebildiği bilinmektedir. Kafa yaralanmaları sonrası hem iletim tipi hem de sensörinöral tip işitme kaybı meydana geldiği gösterilmiştir. Altta yatan mekanizmanın kafa travmalarında sıklıkla rastlanan labirentin konküzyon olduğu varsayılmaktadır. Labirentin konküzyonunun özel bir tedavisi yoktur. Tanı esasen odyometrik testlere dayanır. Bu yazıda kafa travması sonrası karşı kulakta labirentin konküzyon nedeniyle işitme kaybı oluşmuş bir hasta sunduk. İki aylık takip sonrasında, karşı kulaktaki işitme kaybının düzelmediğini gözlemledik.

Anahtar Sözcükler: Labirentin konküzyon, karşı kulakta işitme kaybı, kafa travması.

Türk Otolarengoloji Arşivi, 2011; 49(3):58-60

Abstract

Hearing loss is a known outcome following head trauma. The conductive as well as sensorineural hearing loss have been demonstrated both in cases of head injury. The labyrinthine concussion is postulated to be the underlying mechanism, and it is a common finding in head traumas. There is no specific treatment for labyrinthine concussion. The diagnosis mainly relies on audiometric tests. We reported a case of labyrinthine concussion in the opposite ear of a patient who had head trauma. At 2-month of follow-up, we observed that the contralateral hearing loss of our case persisted.

Key Words: Labyrinthine concussion, contralateral hearing loss, head trauma.

Turk Arch Otolaryngol, 2011; 49(3):58-60

Introduction

Hearing loss after head trauma is well-known phenomenon¹. Most head traumas are considered as mild. They do not require medical care and leave no symptoms or sequelae. Even after minor head traumas, there is relatively high incidence of hearing impairment at least initially and in the early recovery phase. The conductive as well as sensorineural hearing loss have been demonstrated both in cases of closed head injury with fracture of the base of the skull and in cases without fracture². Ipsilateral transverse type of temporal fracture is commonly associated with sensorineural hearing loss. On the other hand, labyrinthine concussion is believed to be the mechanism of contralateral profound hearing loss³. The symptoms of labyrinthine concussion are sensorineural hearing loss with a characteristic notch in the 4 to 6 kHz range resembling acoustic trauma and positional vertigo⁴. An initial hearing loss after head

Dr. Öner Sakallıoğlu, Dr. Cahit Polat

Elazığ Eğitim ve Araştırma Hastanesi, Kulak Burun Boğaz Kliniği, Elazığ

Dr. Erkan Soylu, Dr. İsrail Orhan

Medipol Üniversitesi, Kulak Burun Hastalıkları Anabilim Dalı, İstanbul

Dr. Hasan Baki Altınsoy

Elazığ Eğitim ve Araştırma Hastanesi, Radyoloji Kliniği, Elazığ

trauma, especially in the low and middle frequencies, most often subsides or at least diminishes during the first post-traumatic recovery period². The labyrinthine concussion that the complication of head trauma has been rarely reported in the literature. In this article, we described a case of contralateral profound hearing loss after head trauma.

Case Report

A 49-year-old man presented to Elazığ Training and Research Hospital, Clinic of Otorhinolaryngology one day after suffering blunt trauma by a thick stick to his left temporoparietal region. But, he had complaint of contralateral (right ear) hearing loss. The informed consent was obtained from the patient. An examination revealed that bilateral external auditory canals and the tympanic membranes were normal. Clinically, there was no sign of hemotympanum, facial paralysis, vestibular symptoms or neurological deficit. He only sustained a brief episode of loss of consciousness. A computerized tomography of the temporal bone demonstrated nondisplaced fracture line with pneumocephalus on the left temporoparietal region (Figure 1). A pure tone audiogram showed

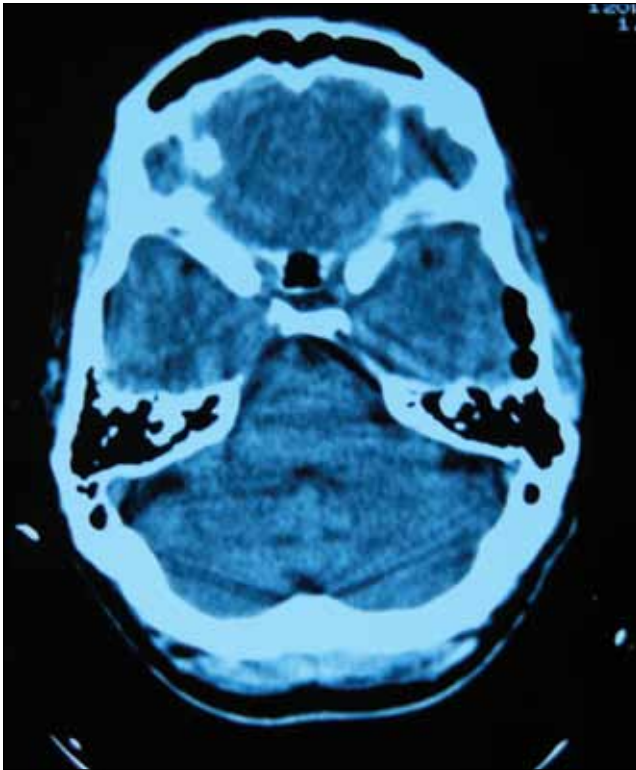


Figure 1. Pneumocephalus on the left temporoparietal region.

left normal hearing and right profound sensorineural hearing loss (Figure 2). Distortion product otoacoustic emission and brainstem evoked response were consistent with the right profound sensorineural hearing loss. The history of the patient was negative for noise exposure, ototoxic drug use or familial hearing loss. He was managed conservatively. There was no improvement of hearing on the right ear after 2 months of follow-up.

Discussion

Hearing loss is common following a head trauma. It is more prone to occur if the pathology involves the temporal side of head, particularly the temporal bone fracture. It has been reported that that head trauma can cause both conductive and sensorineural hearing loss on the opposite side of the trauma³. Sensorineural hearing loss tends to develop in the transverse type of fracture because it frequently involves the labyrinth⁵. A contralateral sensorineural hearing loss secondary to the damage of the inner ear structures is a rare occurrence in patients with head injuries. The labyrinthine concussion is postulated to be the underlying mechanism and it is a common finding in head traumas³. Ulug et al.⁴ reported the three cases of labyrinthine concussion in the opposite ears of patients who had unilateral traumatic temporal bone fractures and they speculated that contralateral labyrinthine concussion occurs as a result of a strong impact to the temporal bone. The diagnosis of labyrinthine concussion mainly relies on audiometric tests⁴. Therefore, we used the audiometric tests as the main diagnostic tool to evaluate the our case.

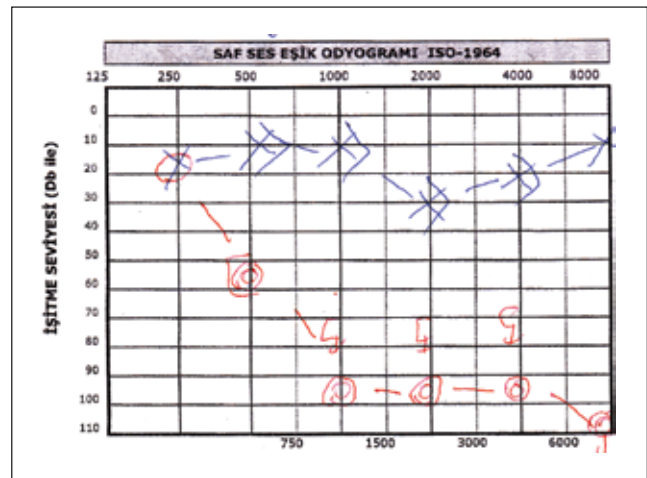


Figure 2. Right profound sensorineural hearing loss.

The mechanism of injury in labyrinthine concussion is not clear. It is speculated that high-pressure waves caused by a severe blow to the head are directly transmitted to the cochlea by bone conduction⁴. A pressure wave can arise through elevated intracranial pressure, which can be transmitted to the inner ear by way of the internal auditory canal, the cochlear aquaduct and the endolymphatic sac. A pressure wave in the cranial skeleton can also have an impact on the inner ear⁶. Sensorineural hearing loss can also be caused by direct disruption of the membranous labyrinth with inflammatory healing by fibrotic connective tissue, scarring and new bone formation. There is no specific treatment for labyrinthine concussion⁴. Khairi et al.³ reported two cases with head trauma who sustained extradural haemorrhage with profound sensorineural hearing loss on the opposite ears. To our knowledge, our case who has contralateral profound hearing loss caused by nondisplaced temporoparietal fracture and pneumocephalus is only case report in the literature. Chujo et al.⁷ reported a temporal bone fracture occurring on the side opposite a facial bone fracture. The patient had conductive hearing loss due to ossicular chain injury. Sensorineural hearing loss following minor head injury and midbrain contusion without evidence of skull fracture had been reported⁸. We reported a patient with contralateral profound hearing loss with nondisplaced fracture on the temporoparietal region.

In conclusion, contralateral sensorineural hearing loss after head trauma is very rare. Labyrinthine concussion is assumed for the etiology. It should be considered that both sensorineural and conductive hearing loss can occur on the opposite ear after the temporal bone trauma. Therefore, the opposite ear must be investigated carefully for hearing loss during the management of a patient with head trauma.

References

1. **Segal S, Eviatar E, Berenholz L, Kessler A, Shlamkovitch N.** Dynamics of sensorineural hearing loss after head trauma. *Otol Neurotol* 2002; 23: 312-5.
2. **Bergemalm PO, Borg E.** Long-term objective and subjective audiologic consequences of closed head injury. *Acta Otolaryngol* 2001; 121: 724-34.
3. **Khairi M, Irfan M, Rosdan S.** Traumatic head injury with contralateral sensorineural hearing loss. *Ann Acad Med Singapore* 2009; 38: 1017-8.
4. **Ulug T, Ulubil SA.** Contralateral labyrinthine concussion in temporal bone fractures. *J Otolaryngol* 2006; 35: 380-3.
5. **Yeakley JW.** Temporal bone fractures. *Curr Probl Diagn Radiol* 1999; 28: 65-9.
6. **Bergemalm PO.** Progressive hearing loss after closed head injury: a predictable outcome? *Acta Otolaryngol* 2003; 123: 836-45.
7. **Chujo K, Nakagawa T, Komune S.** Temporal bone fracture with ossicular dislocation caused by a blow to the opposite side of the head. *Auris Nasus Larynx* 2008; 35: 273-5.
8. **Hunchaisri N.** Bilateral sudden sensorineural hearing loss following unilateral temporal bone fracture. *J Med Assoc Thai* 2009; 92: 76-9.

Conflict of interest statement:

No conflicts declared.

Correspondence: Öner Sakalliođlu M. D

Elazığ Eğitim ve Araştırma Hastanesi, Kulak Burun Boğaz Kliniđi, ELAZIĐ
Phone: (0424) 237 85 07
e-mail: onersakalliođlu@yahoo.com