Hearing Loss After Direct Blunt Neck Trauma

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FROM ABSTRACT

Objective:
To report for the first time hearing impairment resulting from blunt neck trauma.

Study Design: Retrospective chart review of clinical, pure tone, and speech audiometric findings.

The first obtained within 3 months and the follow-up ones between 6 and 12 months after injury.

Patients: Eighty-three patients (166 ears) who reported hearing impairment after blunt neck trauma.

Results: Twenty of the 166 ears (12%) had normal hearing and 137 ears (81.3%) showed an acoustic trauma-like hearing impairment.

Eight ears (4.8%) had a hearing loss of at least 30 dB in the speech frequencies (500-2,000 Hz) and two ears (1.2%) had additional impairment in the higher frequencies.

Only one ear (0.8%) had a conductive hearing loss. No speech discrimination score was poorer than 80%.

Forty-six subjects (55.4%) reported tinnitus.

Conclusions: Blunt neck trauma, like whiplash injury, may cause objectively measurable hearing impairment.

THESE AUTHORS ALSO NOTE:

“Hearing loss after head trauma and whiplash injury is well recognized, and there are many descriptions and theories of direct and indirect mechanisms that might cause substantial damage to the inner ear or central auditory pathways.”

It is these authors clinical experience of occasional reports of hearing loss after blunt neck trauma that motivated them to investigate the dynamics of this problem.

The authors selected 227 cases in which the only trauma was described as being a blunt neck injury.
RESULTS
Hearing impairment after blunt neck trauma was found in 117 of 227 (51.5%) patients.

In 45 patients (90 ears, 54.2%) there was a symmetrical hearing impairment in both ears, all with high-frequency losses.

“Forty-six subjects (55.4%) reported tinnitus that developed within 3 months after the trauma.”

“Thirty-nine noticed the appearance of tinnitus within the first month, five during the second month, and two during the third month.”

“Twenty-seven reported having tinnitus in both ears.”

The authors sought to monitor any changes with time in hearing losses associated with blunt neck trauma.

“In cases of acoustic trauma-like (ATL) hearing loss, improvement was seen during the first year after injury when the impairment was mild or moderate, but not when the ATL was severe.” [This means a poor prognosis]

CASE REPORTS
Case 1
During a soccer game, a 24-year-old apparently healthy man received a blow from an elbow on the right side of his neck. The pain was intolerable and prevented him from continuing to play. He reported a sensation of fullness in the right ear and then of perceiving a whistling sound in that ear. He also reported feelings of dizziness when rising from where he had fallen on the playing field. These symptoms persisted and he was referred to our institution for medical assistance the next day. There was no spontaneous nystagmus, but there was a tendency to fall to the right when the Romberg test was performed. Audiometry revealed a bilateral ATL sensori-neural hearing loss. Electronystagmography was normal. An audiogram performed 8 months later showed no improvement. The patient continued to experience tinnitus but no longer had any balance disorder.

Case 2
While swimming in a pool, a 16-year-old girl received a severe blow to the left side of her neck from the heel of a person descending the water slide. She noticed a buzzing sound in her left ear a few moments later. Its level of intensity decreased after a while but did not completely subside. There was no dizziness, and a physical examination performed the next after was normal. The tinnitus disappeared 1 week later and repeated audiometry performed 6 months after the trauma revealed a return of normal hearing in the left ear.
Case 3
While training for a karate fight, an apparently healthy 25-year-old man received a blow to the left side of his neck from the right palm of his competitor. Immediately afterwards, he felt as if an electric current had hit him. He became dizzy and vomited. He had a feeling of fullness in both ears and reported the presence of tinnitus in the left ear. He was referred to the emergency room, where he was noted to have a grade II spontaneous nystagmus to the right. Two days later, the hearing in the right ear returned to normal, but there was no change in the left ear. A follow-up audiogram performed 9 months later showed no improvement of hearing in the left ear. The patient reported a decrease in the intensity of the tinnitus but that it was still present.

DISCUSSION

“In our regular clinical practice, we encounter many patients who report hearing impairment and dizziness after head and neck trauma.”

“Most of them have experienced either a whiplash injury or a blunt head trauma, but there are some patients who have had blunt neck trauma who also report hearing impairment.”

“Symptoms of dizziness and hearing impairment after whiplash injury are common.”

The rapid acceleration/deceleration effect of whiplash causes sheer forces that act on the cervical spine and soft tissue, which also affect the head. [IMPORTANT]

Several theories for the cause of dizziness have been suggested, such as:

1) A neuromuscular mechanism [Consistent With Subluxation Complex]

2) A neuro-vascular mechanism

3) A mechanical vascular obstruction of the vertebral artery

“It is also worth noting that whiplash injuries frequently damage the brain.”

“The otoliths are obviously vulnerable to accelerations, which might cause otolith vertigo.” [Epley’s canalith repositioning]

“The accelerations need not be violent to dislodge the otoconia, and even relatively mild neck or head trauma may induce these symptoms.”

“Furthermore, most patients with whiplash-associated disorder probably have increased proprioceptive activity of the neck.” [IMPORTANT]
“Little has been reported about auditory repercussion in conjunction with proprioceptive disturbances.” [Harvey Lillard]

“A reflexogenic disturbance of the neck via divergent afferent proprioceptive activity to the central auditory nervous system might be an explanation.” [This is consistent with altered afferent input into the central neural axis caused by the chiropractic subluxation complex, i.e. Harvey Lillard].

“Some support for this theory is the single photon emission computed tomography study on a group of patients with whiplash injury-related disorder. The authors demonstrated parieto-occipital hypoperfusion that they interpreted as having been caused by activation of nociceptive afferents from the upper cervical spine. In this study, a group of patients with nontraumatic chronic neck pain also showed parieto-occipital hypoperfusion. This line of research could suggest that hearing difficulties may be a result of subliminal cochlear lesions or the result of divergent afferent proprioceptive activity to the central nervous system, transmitted reflexogenically from a diseased neck.” [Very Good]

The authors propose “that the same forces that act on the neck in whiplash injuries may act on a neck subjected to direct blunt injury, causing hearing disturbances similar to those ascribed to whiplash injury.” [Good]

“Spontaneous improvement in hearing appeared in approximately one-tenth of the neck trauma patients in our study within the first year after injury.” [Again, this is a poor prognosis].

“More than half of our subjects reported tinnitus that appeared soon after the injury.”

“We conclude that direct blunt neck trauma might cause hearing impairment of various types, usually sensorineural of varying degrees.”

“The pathogenicity might resemble hearing loss after whiplash injury.”

“Spontaneous improvement during the first year after injury may be expected in approximately 10% of the cases.”

KEY POINTS FROM DAN MURPHY

1) Hearing loss and dizziness after whiplash injury is common.

2) In this study of 83 patients (166 ears) who reported hearing impairment after blunt neck trauma, 81.3% showed an acoustic trauma-like hearing impairment.

3) 55.4% of these patients reported tinnitus within 3 months after the trauma.
4) The prognosis for acoustic trauma-like hearing loss is poor, with only 10% showing spontaneous improvement in hearing within the first year after injury.

5) Mild neck trauma and accelerations may dislodge otoliths and cause vertigo.

6) These authors suggest that cervical spine “proprioceptive disturbances” may have auditory repercussion. This is consistent with chiropractic subluxation complex, nerve interference, and the case of Harvey Lillard.