Sensorineural Hearing Loss

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Sensorineural deafness is a type of hearing loss. It occurs from damage to the inner ear, the nerve that runs from the ear to the brain (auditory nerve), or the brain.

Etiology

Cochlear damage (usually causes high-frequency hearing loss) from noise exposure, ototoxic drugs (e.g. aminoglycosides), senile cochlear degeneration, and viral labyrinthitis. Speech discrimination may be relatively preserved

Due to compression of the 8th cranial nerve. Etiologies: CP angle tumor (e.g. vestibular schwannoma). Typically much greater loss of word discrimination out of proportion to pure tone audiogram abnormalities

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Sensorineural hearing loss (SNHL) in hydrocephalus patients has been reported in the literature and the proposed mechanism hypothesized is that increased intracranial pressure (ICP) is transmitted to the perilymph by the cochlear aqueduct, resulting in a relative perilymphatic hydrops and this hydrodynamics leads onto sensorineural hearing loss [1) 2) 3)].

Clinical features

Patients tend to speak with a loud voice

Clinical findings with unilateral hearing loss

a) Weber test will lateralize to side of better hearing (Weber test: place a vibrating 256 or 512 Hz tuning fork on the center of the forehead; the sound will lateralize—sound louder—on the side of

conductive hearing loss, or opposite to the side of SNHL)

b) Rinne test will be normal (AC> BC), called a positive Rinne (Rinne test: place a vibrating 256 or 512 Hz tuning fork on the mastoid process; when sound is no longer heard, move the fork to just outside the ear to see if air conduction [AC] is > bone conduction [BC])

3. further divided into sensory or neural. Distinguished by otoacoustic emissions (only produced by a cochlea with functioning hair cells) or BSAERs

a) sensory: loss of outer hair cells in the cochlea. Etiologies: cochlear damage (usually causes high-frequency hearing loss) from noise exposure, ototoxic drugs (e.g. aminoglycosides), senile cochlear degeneration, viral labyrinthitis. Speech discrimination may be relatively preserved

b) neural: due to compression of the 8th cranial nerve. Etiologies: CP angle tumor (e.g. vestibular schwannoma). Typically much greater loss of word discrimination out of proportion to pure tone audiogram abnormalities

Sensory hearing loss may be distinguished from neural hearing loss by

1. otoacoustic emissions which are only produced by a cochlea with functioning hair cells

2. or BSAERs

3. an elevated stapedial reflex threshold out of proportion to PTA abnormalities is also highly diagnostic of a retrocochlear (neural) lesion

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Sensorineural hearing loss (SNHL) occurs when there is damage to the inner ear (cochlea), or to the nerve pathways from the inner ear to the brain. Most of the time, SNHL cannot be medically or surgically corrected. This is the most common type of permanent hearing loss.

SNHL reduces the ability to hear faint sounds. Even when speech is loud enough to hear, it may still be unclear or sound muffled.

Some possible causes of SNHL:

Illnesses

Drugs that are toxic to hearing

Hearing loss that runs in the family (genetic or hereditary)

Aging

Head trauma

Malformation of the inner ear

Exposure to loud noise…

Prevalence of acute sensorineural hearing loss (ASHL) in vestibular schwannoma (VS) patients early

after radiosurgery is 8.6%, likely due to radiation injury to the cochlear nerve. Thus, when tumor size is <1.45 cm, serviceable hearing is the criteria for determining whether observation policy (with serviceable hearing) or radiosurgery (lack of serviceable hearing) is given. For those tumor sizes ranged 1.45-3.0 cm, radiosurgery is indicated regardless of hearing level [4].

In the absence of randomized controlled trials and larger cohorts, drawing strong conclusions on which patients to treat depending on their initial hearing status and tumor size remains a matter of debate, especially for intracanalicular vestibular schwannoma [5].

Case reports

A 27-year-old woman who presented with a sensorineural hearing loss followed by facial paresis. Magnetic resonance imaging (MRI) and computed tomography (CT) angiography revealed hematoma with adjacent converging veins showing a typical “caput medusa” sign in the left middle cerebellar peduncle, in favor of DVA. Due to the compression effect of hematoma, she underwent surgery. Hearing loss and facial paresis improved significantly during the postoperative follow-up.

Although DVA is mostly benign and asymptomatic, complications such as hemorrhage rarely occur. Hearing loss is an extremely rare presentation that can be attributable to the compression effect on the cranial nerve VII to VIII complex. In the case of compression effect or progression of symptoms, surgical intervention is necessary. A good clinical outcome could be expected postoperatively [6].

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