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The Role of Audiometry in Vestibular Testing

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“Why are you doing a hearing test? My hearing is just fine.”

I’ve heard this frequently enough over the years that I know to take a minute to explain to every vestibular patient, before we get started, why we require an audiogram. I keep it pretty straightforward and simple:

“We do a quick hearing test on every patient complaining of dizziness because we have to be sure there is no infection or inflammation behind your eardrum, and we need to make sure there isn’t any unexplained difference in hearing between the two ears. Some inner ear problems affect hearing as well. Some do not. Knowing your hearing levels will help us rule out some causes.”

Audiometric evaluation is a necessary starting point for a number of reasons, but it primarily provides information about auditory asymmetry, possible retrocochlear pathologies, and the health and integrity of the ear canal and tympanic membrane before caloric irrigation.

Audiometric evaluation consists of pure-tone air and bone-conduction thresholds; speech audiometry, including speech reception threshold (SRT) and speech recognition tests; tympanometry; acoustic reflex threshold and decay tests; speech rollover tests; and, when indicated, otoacoustic emissions (OAEs)

Auditory Symmetry

Auditory asymmetry refers to a significant difference in threshold hearing levels between the ears and indicates the possibility of peripheral vestibular or auditory nerve pathology. The Mayo Clinic[1] uses a criterion of a ‘‘difference of 15 dB or greater averaged across 500, 1000, 2000, 3000 Hz or differences of 15 dB or greater in speech recognition thresholds’’ to determine significant asymmetry.

Although there are numerous causes for asymmetric auditory sensitivity, including middle ear pathologies, various patterns have been linked with specific vestibular disease. Endolymphatic hydrops (Meniere’s disease) is frequently accompanied by unilateral, fluctuating, low-frequency sensorineural hearing loss. Acoustic neuroma is often characterized by an asymmetry in the higher frequencies. Perilymph fistula and labyrinthitis are usually accompanied by unilateral sensorineural hearing loss with no specific pattern or configuration of loss.

Retrocochlear Pathology

Retrocochlear pathology refers to site of lesion at the cranial nerve (CN) VIII, cerebellopontine angle, or root entry zone of the CN VIII into the brain stem. A number of audiometric findings are suggestive of retrocochlear site of lesion and may be found in acoustic neuroma, multiple sclerosis, and a variety of brain stem lesions. Audiometric signs consistent with possible retrocochlear pathology include the following:

1. Asymmetric, typically high-frequency, sensorineural hearing loss
2. Speech recognition scores poorer than would be expected based on audiometric configuration and severity
3. Rollover (decreased speech recognition scores with higher intensity speech presentation levels)
4. Absent or elevated acoustic reflex thresholds or abnormal acoustic reflex decay

The Ear Canal and Tympanic Membrane

The health and integrity of the ear canal and tympanic membrane must be ascertained before beginning vestibular evaluation. Many patients with middle ear pathology will complain of dizziness as well as other auditory symptoms. It is prudent to treat the middle ear problem first to determine whether there is an improvement in the complaint of ‘‘dizziness.’’ Also, treatment might remove confounding factors affecting sensitive evaluation, such as aural fullness, tinnitus, and otalgia, which are common to both middle ear and peripheral vestibular disorders. Conditions such as tympanic membrane perforation, cerumen impaction, external otitis, or discharge may contraindicate caloric irrigation of the external auditory canal.

Footnotes

1. Robinette, Bauch, Olsen, & Cevette, (2000). Auditory brainstem response and magnetic resonance imaging for acoustic neuromas. Arch Otolaryngol Head Neck Surg, 126(8), 963–966.?