

NORTHEAST HEARING AND SPEECH CENTER BULLETIN

Hearing Healthcare News Written for the Most Trusted Physicians in Maine by Northeast Hearing and Speech Center

Ototoxicity:

A Hidden Hearing Risk in Common Treatment Protocols

Written by Laura Keech, Au.D., CCC-A,

Hearing loss caused by medication is one of the most underreported adverse effects in clinical medicine. Ototoxicity—damage to the inner ear from pharmacological exposure—can result in permanent sensorineural hearing loss, tinnitus, and vestibular dysfunction.

Yet in many clinical settings, it is not routinely screened for, and patients are rarely counseled about the risk before treatment begins.

Which Medications Are Involved?

The two most clinically significant classes are aminoglycoside antibiotics and platinum-based chemotherapy agents. Aminoglycosides—including gentamicin, tobramycin, and amikacin—are used for serious infections, including gram-negative sepsis, cystic fibrosis-related respiratory infections, and multidrug-resistant tuberculosis. Cisplatin and carboplatin, used in the treatment of ovarian, testicular, head and neck, and lung cancers, carry

significant cochleotoxic risk.

A 2024 Annual Review of Pharmacology and Toxicology article noted that at least 17 active clinical trials are currently evaluating protective agents against drug-induced hearing loss from these two drug classes alone.

Other medications associated with ototoxic risk include loop diuretics (particularly at high doses or in combination with aminoglycosides), high-dose salicylates, quinine, and certain PDE5 inhibitors. Co-administration of multiple ototoxic agents, renal impairment, and a family history of aminoglycoside sensitivity significantly increase individual risk.

What Monitoring Should Look Like

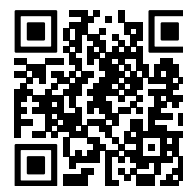
Baseline audiological assessment before initiating an ototoxic treatment regimen is strongly recommended by professional guidelines. For aminoglycosides, this should occur within 72 hours of starting treatment. For cisplatin, it should take place before the

first dose. Monitoring should continue at intervals throughout treatment and for up to 12 months after completion.

Symptoms are not a reliable early warning sign. By the time a patient notices hearing loss, significant cochlear damage may already have occurred. Proactive audiological monitoring is the only way to detect early changes.

Certain genetic mutations—particularly the mitochondrial variant MT-RNR1—dramatically increase susceptibility to aminoglycoside ototoxicity, and testing may be appropriate in high-risk families or those with a history of disproportionate response. Physicians initiating or managing patients on these agents are in the best position to ensure a monitoring plan is in place before treatment begins.

A pre-treatment referral to audiology allows us to establish a verified baseline and provide a framework for ongoing surveillance.



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The Cochlea as a Cardiovascular Window: Hearing Loss and Heart Health

A growing body of research suggests that the inner ear may be one of the earliest sites of damage from cardiovascular disease and its associated risk factors.

For the general physician, this points toward a practical integration: patients with significant cardiovascular histories may warrant earlier hearing assessment, and unexplained sensorineural hearing loss in younger adults may be worth investigating through a cardiovascular lens.

A Shared Vascular Mechanism

The cochlea is a highly metabolically active organ, entirely dependent on its microvasculature for function. The stria vascularis—a highly vascularized layer within the cochlea—requires a continuous blood supply to maintain the ionic environment needed for sound transduction. Any disruption through microangiopathy, atherosclerosis, or endothelial dysfunction can directly cause hair cell death and sensorineural hearing loss.

A 2024 meta-analysis published in *Otolaryngology – Head and Neck Surgery*, which pooled data from more than 1.6

million participants across 10 studies, found that stroke, coronary artery disease, and cardiovascular disease in general were each significantly associated with hearing loss. Individuals with two or more cardiovascular risk factors carry an estimated 90% increased risk of experiencing hearing loss compared to those without such factors.

A large 2025 population-based cohort study from the Gutenberg Health Study found that hearing loss was independently associated with increased cardiovascular and all-cause mortality risk, even after adjustment for confounders – positioning hearing loss not just as a consequence of cardiovascular disease but potentially as a marker of systemic vascular health.

Clinical Implications by Condition

- **Diabetes:** Thought to damage the stria vascularis through glycosylation, oxidative stress, and basement membrane disruption. Diabetic patients have significantly elevated rates of sensorineural hearing loss, often at frequencies that precede standard audiogram detection.
- **Hypertension:** Associated with cochlear

microvascular compromise and accelerated age-related hearing loss across multiple longitudinal studies.

- **Stroke and coronary artery disease:** Both show strong associations with sensorineural hearing loss in large-scale analyses, including reduced word recognition scores reflecting neural cochlear involvement.
- **Sudden sensorineural hearing loss—**unilateral rapid-onset hearing loss—should always be considered a vascular emergency until proven otherwise. Prompt same-day referral is essential.

A Practical Integration

We encourage you to consider hearing status when managing patients with established cardiovascular disease, particularly those over 50. A simple question about difficulty hearing in noise may identify patients who would benefit from referral.

For patients who present to us with unexplained sensorineural hearing loss at younger ages, we will in turn flag the potential cardiovascular significance to you so that systemic risk factors can be reviewed as appropriate.

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Who is Northeast Hearing & Speech Center

Since 1924, Northeast Hearing & Speech Center has been providing speech language pathology and audiology services, as well as the latest hearing aid technology for people of all ages.



info@nehsc.org

Phone: 207 874 1065

Learn more at www.nehearingandspeech.org

