

Ototoxic and Vestibulotoxic Drugs

Loop Inhibiting Diuretics

- **Furosemide, ethacrynic acid, and bumetanide** (bumes) Ototoxic effects more acute when medications are intravenous.
- Damages to Stria vascularis. Synergistic effect when administer with other ototoxic medications.

Infection Control

- Aminoglycoside antibiotics are cleared more slowly from the fluids of the inner ear than from blood serum. Therefore, the concentration in perilymph will remain high after the concentration in the blood has fallen off.
- Aminoglycosides have been detected in the cochlea months after final dose administration. The retention of aminoglycosides may account for delayed onset of hearing loss and prolonged susceptibility to noise-induced hearing loss.
- Since aminoglycosides are cleared through the kidneys,

their concentration may stay higher if the patient has renal dysfunction.

Cancer Chemotherapeutics

- **Cisplatin** is a Chemotherapy drug used to treat cancer patients. The hearing loss is bilateral and symmetrical, involving the high frequencies first and the low frequencies.
- Severity of hearing loss depends on the type of tumor, pre-chemotherapy loss, mode of drug administration, renal function, and age.
- Hearing loss is cumulative.

Pain Management

- **Quinine**, with it's increasing popularity for the treatment of nocturnal leg cramps makes quinine ototoxicity a relevant clinical problem. The hearing loss is typically mild to moderate and bilaterally symmetric. Low serum quinine concentrations, which occur

among tonic drinkers, may lead to clinically significant vestibular changes.

- Salicylates and many non-steroidal anti-inflammatory drugs (NSAID's) is ototoxicity manifesting as mild to moderate reversible hearing loss and tinnitus.
- In one study, five patients suffered hearing loss while receiving naproxen, and only two recovered their hearing after discontinuing.
- Tinnitus is an early symptom.
- Congenital permanent hearing loss has been linked to the use of these drugs during pregnancy.

High Risk Factors:

- Impaired renal function
- Prolonged treatment course
- Advanced age (over 65)
- Previous aminoglycoside therapy
- Sensorineural hearing loss
- Occupational noise exposure while taking these medications

Chronic Disease and Co-morbidity with Hearing Loss

Diabetes

- High blood glucose causes tiny blood vessels in the inner ear to break, disrupting sound reception.
- Mechanisms related to neuropathic or microvascular factors, inflammation, or hyperglycemia causes an association between diabetes and hearing loss.
- Up to 30% of adults with diabetes will experience hearing loss.

Thyroid disease

- Hypothyroidism (under active thyroid) causes hearing loss that may be conductive, sensorineural or mixed in nature, although it is primarily sensorineural.
- Most losses are flat, bilateral, symmetrical with no vestibular involvement.
- Hearing loss may increase with severity of hypothyroidism.

Chronic Kidney disease

- The kidney and blood supply in the inner ear share physiologic, ultrastructural and antigenic similarities.
- CKD shows a higher prevalence of hearing loss among older adults.
- Diabetes is the cause of 44% of the cases of chronic renal disease.

Cardiovascular disease

- Inadequate blood supply and trauma to inner ear blood vessels can contribute to hearing loss.
- Hearing loss appeared in almost 80% of the people who had suffered from a cardiovascular disease.
- A stroke is a vascular trauma in the brain affecting the nervous system, motor and thought processes. Strokes can decrease hearing on the affected side of the brain.
- Broad research has shown negative influence of impaired cardiovascular health on both peripheral and central auditory systems.

Alzheimer's / Dementia Neurology

- Significantly higher % of people with ALZ may have hearing loss than normally aging peers.
- Research has shown that use of hearing aids has helped to reduce ALZ-related problems.
- Study at John Hopkins University reported patients with hearing loss had up to 5X higher risk of dementia than patients with no hearing problems.



Mission

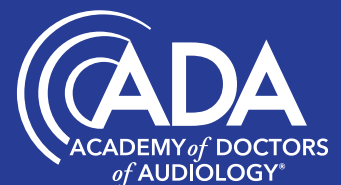
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