Drugs causing damage to the inner ear are commonly referred to as ototoxic and can result in symptoms of tinnitus, vertigo or hearing loss. Specifically, if hearing is impaired they are designated as "cochleotoxic" and if balance is impaired, they are termed "vestibulotoxic" [1]. Otoxicity remains a clinical concern due to its reported association with at least 130 medications [2]. Symptom severity is varied among patients, but in general, initially includes high-frequency hearing loss. Unfortunately, the incidence of ototoxicity has been largely underreported because high-frequency hearing loss does not tend to interfere with routine communication and usually goes unnoticed. Perhaps the most concerning issue with cochleotoxic drugs is if hearing impairment becomes permanent. This can significantly impact quality of life, and therefore should be considered when choosing drug therapy to minimize risk. Thankfully, many reported ototoxic medications such as the aminoglycoside antibiotics have well documented risk or are considered alternative therapy. However, with renewed interest in the use of prophylactic antibiotics to improve quality of life and reduce frequency of exacerbations in chronic obstructive pulmonary disease (COPD) it is timely to discuss this potentially irreversible complication.

Antibiotics and antineoplastic agents are perhaps the most commonly used medications that can cause hearing loss. Although both cause ototoxicity due to oxidative stress, the mode of cell death differs. Cisplatin primarily triggers an apoptotic cell death pathway, whereas aminoglycosides trigger both necrotic and apoptotic cell death pathways. Understanding of this mechanism of action has aided the development of novel ways to protect the cochlea [1]. Aminoglycosides have a long-standing history and all oral formulations are considered to have some form of ototoxicity. While the overall risk of ototoxicity associated with any topical aminoglycoside remains low, the overall prevalence of complications such as acute otitis media warrants caution. Monitoring baseline hearing and review of the medication regimen for ototoxic agents is necessary should be emphasized. Further research is needed to prevent or augment ototoxicity, but utilization of these techniques can help minimize its impact in practice.

References


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