

Hearing loss and cancer treatments.

Information for your patients.

Physicians are well aware of the many side effects of chemotherapy and radiation treatment. However, only in recent years has research addressed the risk of hearing loss and related conditions (e.g. tinnitus) as reported by numerous post-cancer treatment patients. These studies have revealed a strong link between hearing loss and cancer treatments, especially among certain chemotherapy medications.

It is important for both physician and patient to understand the risk of ototoxicity when treating cancer, and its long-term implications, which may include permanent hearing loss.

Ototoxicity and its relationship to cancer treatments.

Certain chemotherapy medications or radiation therapy can cause ototoxicity, which may be manifested as temporary or permanent hearing loss, depending on the type treatment and the extent of hearing damage.

Ototoxicity resulting in sensorineural hearing loss (SNHL) refers to drug or chemical damage to the inner ear where cochlear hair cells vibrate in response to sound waves. This damage may affect vital hearing and balance information to the brain, resulting in hearing loss, tinnitus, and/or loss of balance.

Platinum-based chemotherapy medications, particularly cisplatin and carboplatin, are considered the primary "culprits" when it comes to ototoxicity. Other potentially ototoxic chemotherapy drugs include Bleomycin, Vincristine, Vinblastin, Bromocriptine, and Methotrexate Nitrogen mustard¹.

Chemotherapy from the "platinum" group is frequently used to treat brain, head and neck cancers, as well as lung, bladder and ovarian cancers in adults. It is also commonly used to treat brain, bone and liver cancers in children.

Effects of ototoxicity in adults.

- Physical effects of hearing loss including balance issues and a greater likelihood of falls² over time, especially in older adults. Hearing loss has also been linked to the development of certain forms of dementia³ and cognitive decline.
- Psychological fallout, including depression, isolation, anxiety, anger, and poor self-image⁴.
- Economic impact, which includes higher rate of unemployment, difficulty retaining a job or advancing career⁵.

The most common ototoxic cancer treatments associated with hearing damage are platinum-based chemotherapy agents (cisplatin and carboplatin in particular) and radiation of head and neck.

Hearing loss and tinnitus are underreported after effects of cancer treatment, especially in children.

The effects of untreated hearing loss on adults include increased potential for falls, depression and other psychological disorders; job difficulties and economic losses. In children, even mild hearing loss could result in delays in acquiring language, compromised speech comprehension, learning deficits, and psychological and social difficulties.

It is crucial to involve a hearing care professional during and after cancer treatment to help monitor effect of exposure to ototoxic chemotherapy and offer treatment and rehabilitation, which may include hearing aids.



Because of the long-term effects of hearing loss in adult survivors, and the debilitating effects associated with the condition, oncologists will likely do their utmost to mitigate ototoxic exposure during treatment. When aggressive treatment is necessitated, and the patient experiences hearing loss, it is important to consider treatment options such as hearing aids, which can help 95% of patients with hearing loss. As cancer treatments have more success, and cancer patients live longer, hearing loss treatment, could improve the patient's quality of life after cancer treatment.

*"Twenty years ago, many patients considered themselves lucky to survive – now medical advances mean that quality of life after treatment is also crucial"*⁶

Effects of ototoxicity in children

Although limited statistical data is available, researchers believe the number of cancer-surviving children with hearing loss (as a result of ototoxic exposure) is significant. One landmark study of 67 patients age 8 to 23 undergoing chemotherapy found 61 percent developed hearing loss⁷ after treatment – most experiencing high-frequency hearing loss (HFHL).

HFHL in children primarily affects comprehension, yet children may not realize they are not interpreting speech properly and so the condition goes underreported, and undiagnosed. Left untreated, consequences include⁸:

- Significant delay in speech and language development
- Negative impact on cognitive development and educational outcomes
- Interference with psychosocial development

*"And that can lead to development issues. A study that evaluated the educational performance and social-emotional functioning of about 1200 children with minimal hearing loss revealed that 37% failed at least one grade in school compared with the normal 3%. They also had more problems with behavior, energy, stress and self-esteem."*⁹

Summary

Hearing loss can be a negative after-effect of certain chemotherapy medications and radiation therapy. While treatment is ongoing, an audiologist can assist with monitoring for ototoxicity and make recommendations for early intervention if possible. As medications improve, more treatment options become available, and survival rates continue to rise, the need for medical professionals to consider quality of life post-treatment becomes crucial. After treatment is complete, an audiologist should evaluate the patient for ototoxic after-effects and if necessary offer counseling, treatment – which could include hearing aids and rehabilitation.

¹ American Tinnitus Association. Ototoxic Brochure by League for Hard of Hearing. 2012.

² USNews.com. Hearing Loss Triples Risk of Falling: Study. 2012

³ Johns Hopkins Medicine. Hearing Loss Accelerates Brain Function Decline in Older Adults. 2013

⁴ Mary Kaland, Kate Salvatore. The Psychology of Hearing Loss. The ASHA Leader. 2002

⁵ David Jung, Neil Bhattacharyya. Association of Hearing Loss with Decreased Employment and Income Among Adults in the United States. Annals of Otology, Rhinology & Laryngology. 2014

⁶ Mark Downs, Executive Director of technology and Enterprise of the British RNID

⁷ Hear-it. Chemotherapy can cause hearing loss. Audiology Online; RNID. 2009

⁸ Johnnie K. Bass, Stephanie T. White, Skye E. Jones. Monitoring Ototoxicity in the Pediatric Oncology Population. American Speech-Language-Hearing Association. 2014

⁹ Oregon Health & Science University. "Hearing Loss From Chemotherapy Underestimated." ScienceDaily. December 2005. <www.sciencedaily.com/releases/2005/12/051212164355.htm>. (link to <http://www.sciencedaily.com/releases/2005/12/051212164355.html>).

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