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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 might manifest as temporary or permanent hearing loss, depending on the type of 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 could 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. They are believed to produce unstable molecules commonly known as free radicals that can damage cell walls, cellular structures, and genetic material within cells.[1] Other potentially ototoxic chemotherapy drugs include Bleomycin, Vincristine, Vinblastin, Bromocriptine, and Methotrexate Nitrogen mustard.[2]

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 falls over time, especially in older adults. Hearing loss has also been linked to the development of certain forms of dementia and cognitive decline.[3]
- Psychological fallout, including depression, anxiety, frustration, or social isolation and fatigue.[4]
- Economic impact, which includes higher rate of unemployment and difficulty retaining a job or advancing career[5].

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.

Hearing Systems

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Because of the long-term effects of hearing loss in adult survivors, and the debilitating effects associated with the condition, oncologists should 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 percent of patients with hearing loss. As cancer treatments succeed more often, and cancer patients live longer, hearing loss treatment could improve the patient's subsequent quality of life.

"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 loss[7] 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, so the condition goes underreported and undiagnosed. Left untreated, consequences include:

- Significant delay in speech and language development
- Negative impact on cognitive development and educational outcomes
- Interference with psychosocial development[8]

"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.

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