

Some Features Of Sensorineural Hearing Loss In Neurological Practice

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Abstract

This study presents scientific results on certain aspects of sensorineural hearing loss in neurological practice. Modern research indicates that sensorineural hearing loss is associated with oxidative stress, microcirculation disorders, and inflammatory processes. The introduction of new diagnostic methods, such as molecular genetics, neurodegeneration biomarkers, and imaging techniques, has improved early diagnosis and disease prognosis. Thus, for the treatment of sensorineural hearing loss occurring in neurological diseases, modern therapeutic strategies include the use of neuroprotectors, antioxidants, gene therapy, and cellular regeneration of the auditory nerve.

Key words: sensorineural hearing loss, **neuroprotectors**, gene therapy, biomarkers

INTRODUCTION

Sensorineural Hearing Loss (SNHL) is one of the most common forms of hearing impairment, often associated with neurodegenerative, vascular, and autoimmune diseases. Sensorineural hearing loss (SNHL) is a hearing disorder caused by damage to the hair cells of the inner ear or the auditory nerve. According to data from *Frontiers in Neurology* (2023), more than 466 million people worldwide suffer from SNHL, and it is projected that by 2050, this number will exceed 900 million. SNHL is linked to cognitive impairments, dementia, and depression (Hearing Loss in Neurological Disorders, 2021), making it a significant problem in neurological practice.

Materials and Methods: Modern diagnostic and treatment methods, including neuroimaging, genetic analysis, and cellular technologies, not only help slow the progression of SNHL but also significantly improve patients' quality of life. Further research in personalized medicine and regenerative technologies will open new perspectives for SNHL therapy. This review is based on the analysis of scientific publications from 2021 to 2024, presented in international peer-reviewed journals (*Frontiers in Neurology*, *Gene Therapy*, *Journal of Neurology*, *Auris Nasus Larynx*). The issues of etiology, pathogenesis, diagnosis, and treatment of SNHL with a focus on modern approaches are considered.

Results and Discussion:

Modern Methods of SNHL Diagnosis: The following methods are used for detecting SNHL:

- **Audiological studies** (audiometry, otoacoustic emissions);
- **Neuroimaging** (MRI, CT) – allows for detecting vascular and tumor changes (*Journal of Neurology*, 2023);
- **Inflammation and neurodegeneration biomarkers** – help in predicting the course of the disease (*Inflammatory markers and the risk of idiopathic sudden sensorineural hearing loss*, 2023);
- **Genetic testing** – identifies mutations predisposing to SNHL (*Gene therapy for hearing loss*, 2024).

New Therapeutic Approaches: Treatment for SNHL includes several approaches:

1. **Pharmacotherapy** – antioxidants (e.g., N-acetylcysteine), neuroprotectors, and anti-inflammatory drugs (*Current AAV-mediated gene therapy in sensorineural hearing loss*, 2023).
2. **Gene therapy** – the use of AAV vectors for delivering therapeutic genes (*Gene Therapy*, 2023).
3. **Cellular therapy** – stem cells promote the regeneration of hair cells in the cochlea (*Stem cell therapy in sensorineural hearing loss*, 2023).
4. **Cochlear implants** – modern devices improve auditory neuroplasticity (*Assessment of prognostic biomarkers in sudden sensorineural hearing loss*, 2023).
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Conclusion: Thus, the effectiveness of SNHL treatment depends both on modern therapeutic approaches and the correct selection of methods, primarily aimed at eliminating the etiological factor. With adequately

selected treatment and adherence to preventive measures (such as quitting smoking, alcohol, and drug use, sufficient physical activity, learning to overcome episodes of nervous-psychological stress, and stressful situations), the prognosis is favorable.

References:

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