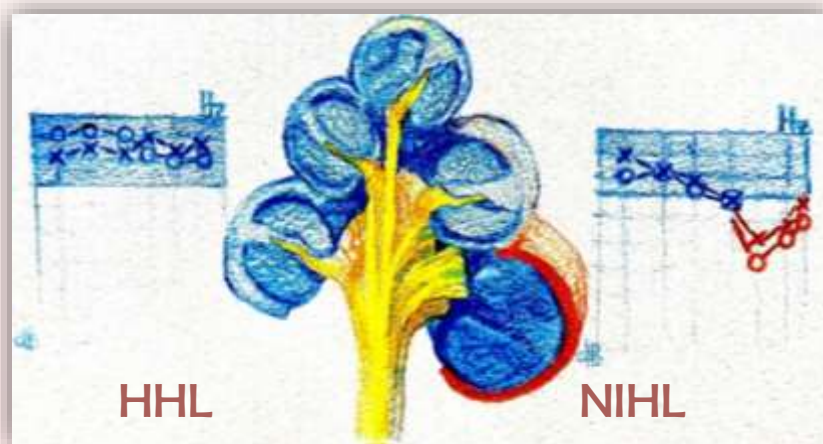


EARLY DIAGNOSIS OF HIDDEN HEARING LOSS AS THE PREVENTION OF HEARING IMPAIRMENT IN OLDER WORKING-AGE POPULATION



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Introduction

Noise-induced hearing loss (NIHL) is preceded by a cochlear synaptopathy and a consequential hidden hearing loss (HHL) with no shift in hearing threshold. In middle-aged working-age population, HHL or NIHL are exacerbated by the onset of age related-hearing loss. The hearing threshold usually shifts bilaterally at high frequencies after years of exposure to noise intensity levels greater than 87 dB(A) during the 8-hour working day. The objective was to

analyse the applicability of existing procedures in the diagnosis of HHL in order to prevent further noise exposure and the following hearing impairment.

Methods

Literature review was made in PubMed Database using keywords: age-related hearing loss; noise-induced hearing loss; hidden hearing loss. We did our research on studies published in the past 20 years.

Results

As a direct measure of the cochlear synaptopathy degree, some studies suggest the reduction in the auditory brainstem response wave I amplitude and others an increase in the ratio of summing and action potential. However, wave I amplitude is highly variable in humans, and it is not completely clear how loss of cochlear synapses leads to an increase of summing potential. Loss of synapses was also found in autopsy material of otologically healthy

persons, suggesting that this synaptopathy may be independently mediated by aging. On the other hand, prolonged noise exposure at the workplace increases sympathetic activity and causes an increase of the cortisol concentration in the blood. This increase is consistent with the increase of salivary cortisol and salivary cortisone concentrations easily measured during the workday.

Conclusion

Auditory and extra-auditory noise effects should be observed simultaneously and measured non-invasively. Except standard audiological test battery, electrophysiological results, such as auditory brainstem response findings should be also taken into account and supplemented by psychometric and hormonal findings. With such diagnosis and with evidence of excessive noise exposure, it is important to find technical solutions or restrict the work in such hazardous

working environment and to advise workers on the use of personal protective equipment with regular supervision. Further studies should explain the relative contribution of noise exposure and age, respectively, to the development of cochlear synaptopathy. This kind of approach to the early diagnosis could significantly reduce the risk of developing severe hearing loss in older age and eventually increase the work capacity of noise-exposed workers.