

Does exposure to sound trauma induce Auditory Neuropathy in humans? - a case control study in Northern Sweden

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Background: Sound trauma may induce auditory associated symptoms, and temporary or permanent shift of hearing thresholds, usually investigated solely with a tone audiogram. Until recently it has been assumed that these changes after sound trauma represent damage to the sensory hair cells. Contrary, animal studies have now shown persistent auditory neuropathy (AN), despite signs of normal functioning hair cells after sound trauma. AN involves a variety of disease mechanisms in the cochlea and auditory nerve, affecting the synaptic encoding and/or neural transmission of auditory information. This dysfunction usually affects the processing of acoustic time signals necessary for; speech understanding, sound localization, and speech discrimination in background noise.

Aim: to evaluate if patients exposed to sound trauma suffer from AN.

Method:

Inclusion: Thirty-one subjects, exposed to a sound trauma and 31 age and gender matched controls.

Audiologic testing: pure tone audiometry, speech intelligibility in noise, brain stem audiometry and transient evoked otoacoustic emissions/cochlear microphonics.

Preliminary results: Mean PTA4 (right/left) were 26/25dB in the case group compared to 11/12dB in the control group. Sixteen out of 31 subjects in the case group qualifies for the AN diagnosis. In the control group one out of 31 subjects presents signs for the diagnosis.

Conclusion: Considering the preliminary results, it would be recommended to examine the patients who have been exposed to a sound trauma with several hearing tests to exclude AN.