

Hyperbaric Oxygen Therapy for Patients With Sudden Sensorineural Hearing Loss: A Systematic Review and Meta-analysis

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Abstract

Importance: Sudden sensorineural hearing loss (SSNHL) is an acute, usually unilateral deficit. Systemic and intratympanic steroids are accepted treatments. Although evidence suggests that hyperbaric oxygen therapy (HBOT) may be beneficial, it is not widely offered.

Objectives: To review and evaluate recent evidence of the association of HBOT with hearing outcomes in SSNHL and to determine if HBOT should be a single or part of a combination treatment regimen.

Data sources: Cochrane Central Register of Controlled Trials, PubMed, EMBASE, CINAHL, Web of Science, CAB, ICTRP, Google Scholar, Clinicaltrials.gov, and ISRCTN databases were searched for randomized controlled trials (RCTs) published in English from January 1, 2000, and April 30, 2020.

Study selection: Prospective RCTs involving only adult participants (≥ 18 years) with SSNHL and comparing HBOT, as a single or combination therapy, with control therapies, such as steroids and/or placebo. Only RCTs that used the American Academy of Otolaryngology-Head and Neck Surgery's diagnostic criteria for SSNHL were included.

Data extraction and synthesis: Data were extracted independently by 2 researchers. A fixed-effects model was used for analysis and performed from November 30, 2020, to May 20, 2021.

Main outcomes and measures: The mean difference in absolute hearing gain recorded by pure-tone audiometric (PTA) thresholds averaged across 4 low (0.5, 1, 2, and 3 or 4 kHz) or 3 high (3 or 4, 6, and 8 kHz) frequencies was the primary outcome. The secondary outcomes were the odds ratio of hearing recovery defined as a hearing gain of ≥ 10 decibels (dB) in PTA average and treatment-related adverse effects.

Results: Of the 826 records initially identified, 358 duplicates and 451 articles were excluded based on article type, title, and abstract. The full texts of 17 articles were reviewed, of which 14 were excluded because they were either not prospective RCTs (11 articles), the participants were less than 18 years old (2 articles), or the PTA was not reported at frequencies of interest (1 article). Three prospective RCTs with a total of 88 participants who received HBOT in the intervention groups and 62 participants who received only medical therapy in the control groups were studied. The intergroup difference in mean absolute hearing gain (mean difference, 10.3 dB; 95% CI, 6.5-14.1 dB; $I^2 = 0\%$) and the odds ratio of hearing recovery (4.3; 95% CI, 1.6-11.7; $I^2 = 0\%$) favored HBOT over the control therapy.

Conclusions and relevance: In this systematic review and meta-analysis, HBOT as part of a combination treatment was significantly associated with improved hearing outcomes in patients with SSNHL over control treatments.