

Inner ear barotrauma and inner ear decompression illness: a systematic review on differential diagnostics

Oskari H. Lindfors¹, Anne K Räisänen-Sokolowski², Timo P Hirvonen¹, Saku T Sinkkonen¹

¹ University of Helsinki & Helsinki University Hospital, Dept. Of Otorhinolaryngology, Head and Neck Surgery, Helsinki, Finland

² University of Helsinki & Helsinki University Hospital, Dept. Of Pathology, Helsinki, Finland



Background

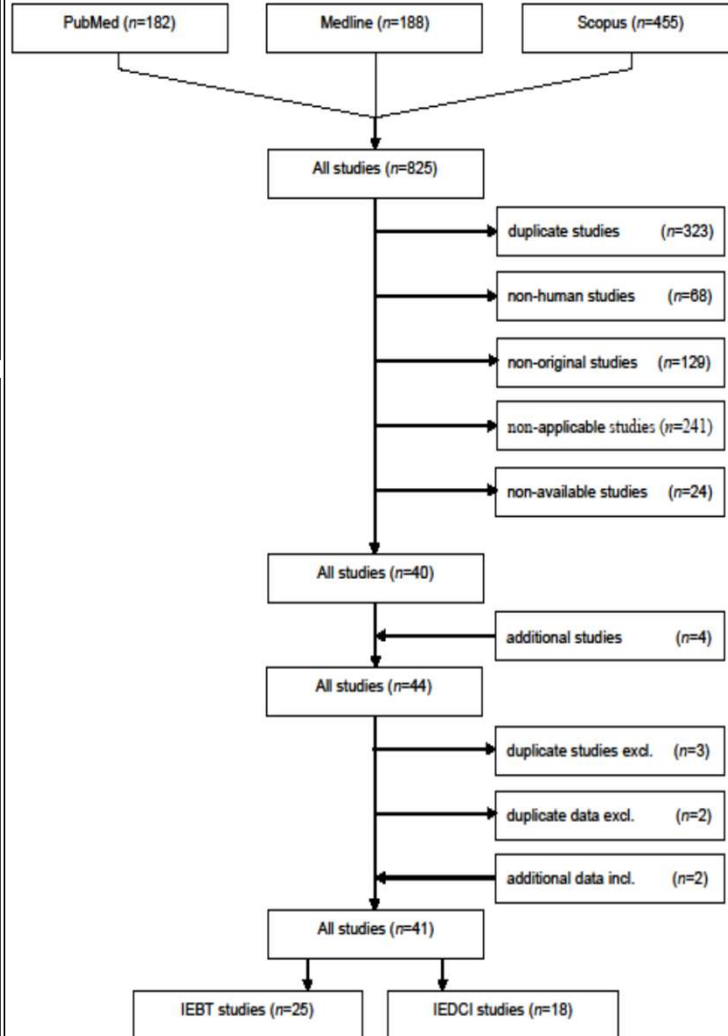
Inner ear barotrauma (IEBT) and inner ear decompression illness (IEDCI) are the two dysbaric inner ear injuries associated with diving.

Both conditions manifest as similar cochleovestibular symptoms, causing difficulties in differential diagnostics and possibly delaying (or leading to inappropriate) treatment.

Methods

A systematic review consisting of preliminary and systematic searches covering three databases (Pubmed, Medline, Scopus). The studies were included when reporting of one or more IEBT or IEDCI patients in connection to diving.

Missing and duplicate data were minimized by contacting the authors when necessary.



Results

The systematic review included 25 studies with IEBT patients (n=183) and 18 studies with IEDCI patients (n=397).

The variables most useful in differentiating between IEBT and IEDCI were dive type (free diving vs. scuba diving), dive gas (compressed air vs. mixed breathing gases), dive profile (mean depth 13 msw vs. 43 msw), symptom onset (when descending vs. when ascending or surfacing), and distribution of cochleovestibular symptoms (vestibular vs. cochlear, isolated vs. non-isolated).

The variables related to middle ear equalization (middle ear equalization difficulties or middle ear barotrauma) were not as reliable in the differential diagnostics between IEBT and IEDCI.

Conclusions

The systematic review elaborates the differential diagnostics of inner ear injuries in connection to diving. Future research on poor middle ear equalization in connection to both IEBT and IEDCI is needed.

