A Review of Otologic Indications for Hyperbaric Oxygen Therapy

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Background

Hyperbaric oxygen therapy (HBOT) is proposed to exhibit its therapeutic effects by increasing tissue hydrostatic pressure and elevating the partial pressure of oxygen. While some otologic conditions are indications for HBOT, there is no comprehensive review of current evidence.

Methods

This narrative review was conducted using PubMed, Embase, Google Scholar, and the Cochrane Library of Systematic Review.

Inclusion Criteria

- Relevant abstracts pertaining to
  - Inner ear decompression injury
  - Acute acoustic trauma
  - Sudden sensorineural hearing loss
  - Bell's palsy
  - Skull base osteomyelitis
- Primary and secondary research
- Relevant clinical practice guidelines from
  - American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS)
  - Undersea and Hyperbaric Medical Society (UHMS),
  - Canadian Undersea and Hyperbaric Medicine Association (CUMHA).
- Studies not available in the English language or where no translation was available were excluded.

Quality of Evidence

Quality of evidence was evaluated using the Grading of Recommendations. Assessment, Development and Evaluation (GRADE) framework [1].

Inner Ear Decompression Injury (IEDCS)

First-line treatment for IEDCS is recompression therapy via HBOT. The evidence in favour of HBOT is strong but consists primarily of case reports or retrospective studies. A recent meta-analysis of 48 divers showed improvement in SSNHL among 80% of patients [2]. However, consensus is that HBOT should be administered promptly for IEDCS once contraindications have been ruled out.

Sudden Sensorineural Hearing Loss (SSNHL)

HBOT is currently a potential treatment modality for SSNHL within two weeks of symptom onset or as a salvage therapy within 1 month of symptom onset according to AAO-HNS guidelines [3].

Treatment results are mixed with significant variability with respect to patient symptoms, treatment regimens, and outcome measures. Results are further complicated by the high percentage of spontaneous recovery from SSNHL.

Acute Acoustic Trauma (AAT)

HBOT for AAT has not been well studied. A recent systematic review and later narrative review found that HBOT should be considered as a treatment option for patients, however metanalysis was precluded given the significant methodological heterogeneity between studies [4,5].

Table 1. Summary of level of evidence

Indication	Recognized by UHMS	GRADE
Inner Ear Decompression Sickness	No	C
Sudden Sensorineural Hearing Loss	Yes	C
Acute Acoustic Trauma	No	C
Bell's Palsy	No	C
Malignant Otitis Externa	No	C

Bell's Palsy

There are currently no guidelines regarding HBOT for Bell's palsy, but it is postulated HBOT may reduce hypoxia-induced nerve damage within the fallopian canal. One randomized control trial demonstrated possible improvement in recovery time and recovery rates but had incomplete blinding.

Skull Base Osteomyelitis (SBO)

To our knowledge, no randomized controlled trials exist for HBOT for SBO. HBOT's potential utility as an adjunctive therapy in refractory or advanced cases could be considered.

Conclusion

This review highlights the current state of research on otologic indications for HBOT. Further high-quality investigations are required, and should address the significant variations in clinical availability, standard of care, and treatment duration. A cost-effective analysis of this resource-intensive therapy is crucial to evaluate its potential long-term adoption.

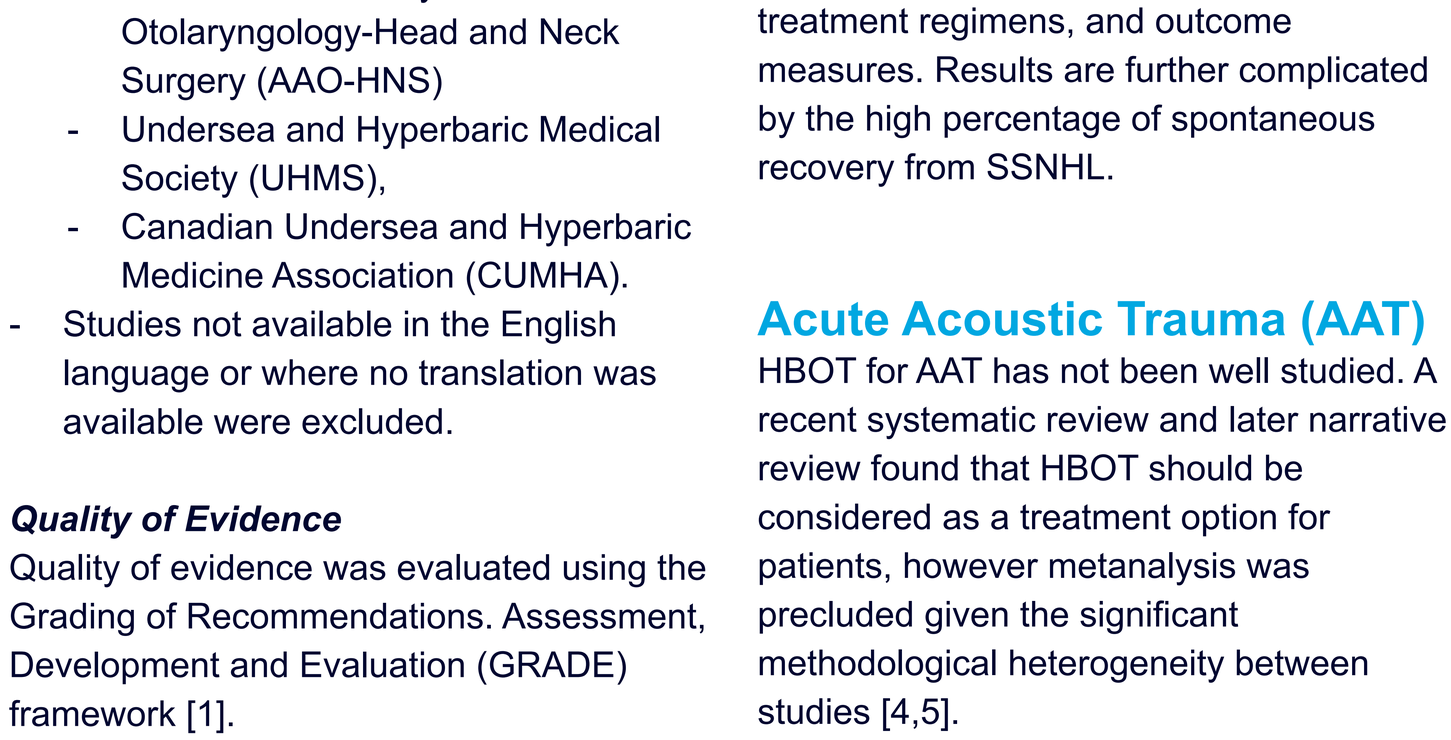

Figure 1. Hyperbaric unit at Vancouver General Hospital.

References

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