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Hyperbaric Oxygen Therapy in Otorhinolaryngology: Contemporary Approaches in Management and Treatment

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Introduction

Hyperbaric Oxygen Therapy (HBOT) is an established medical treatment that involves the administration of 100% oxygen at pressures greater than atmospheric pressure, typically in a hyperbaric chamber. Initially developed for the treatment of decompression sickness in divers, HBOT has since expanded to numerous medical applications, including various conditions within otorhinolaryngology (ENT). This paper explores contemporary approaches in the management and treatment of ENT conditions using HBOT, examining its efficacy, mechanisms and specific clinical applications [1].

Description

The therapeutic effects of HBOT are primarily attributed to the enhanced delivery of oxygen to tissues, which is achieved through increased atmospheric pressure. Under normal atmospheric conditions, oxygen is transported in the blood by hemoglobin. However, at pressures typically used in HBOT (2-3 atmospheres absolute), the amount of dissolved oxygen in plasma increases significantly, facilitating enhanced oxygen delivery to hypoxic tissues. HBOT increases tissue oxygenation, which is critical in healing hypoxic or ischemic tissues. Angiogenesis and collagen synthesis increases oxygen levels stimulate the formation of new blood vessels and collagen production, crucial for wound healing. HBOT modulates the inflammatory response, reducing edema and cytokine production. High oxygen levels inhibit the growth of anaerobic bacteria and enhance the efficacy of antibiotics. HBOT has shown promise in several ENT conditions, providing an adjunctive treatment option that can improve outcomes in otherwise difficult-to-treat scenarios. Sudden Sensorineural Hearing Loss (SSNHL) is a rapid-onset hearing loss of more than 30 dB over at least three contiguous audiometric frequencies, typically occurring within 72 hours. Despite the unclear etiology, it is believed to involve vascular, viral, or immune-mediated mechanisms. Traditional treatments include corticosteroids, either systemic or intratympanic [2,3].

HBOT is often used as an adjunctive treatment for SSNHL. Studies have demonstrated that combining HBOT with steroids can improve hearing recovery compared to steroids alone. The increased oxygenation aids in the recovery of the cochlear structures and promotes repair processes in the inner ear. Meta-analyses have supported the use of HBOT in SSNHL, showing statistically significant improvements in hearing outcomes, particularly when initiated early. Chronic Refractory Osteoradionecrosis (ORN) is a severe complication of radiation therapy for head and neck cancers, characterized by necrosis of irradiated bone. The mandible is most commonly affected, leading to significant morbidity [4].

HBOT is employed to enhance wound healing and reduce the progression of necrosis. It promotes angiogenesis and increases the oxygen supply to the irradiated tissues. Clinical studies have shown that HBOT can reduce pain, promote soft tissue healing, and decrease the extent of necrotic bone, reducing the need for surgical interventions. In reconstructive surgery for head and neck defects, grafts and flaps are often used. These tissues can sometimes suffer from ischemia and hypoxia, leading to partial or total graft failure. HBOT can enhance the survival of compromised grafts and flaps by improving oxygenation and promoting angiogenesis. It has been shown to increase flap survival rates and reduce complications such as infection and necrosis. HBOT is particularly beneficial in salvage situations where initial healing has been inadequate. Chronic otitis media and mastoiditis, particularly when refractory to conventional treatments, can benefit from HBOT. HBOT's antimicrobial and anti-inflammatory effects help in resolving chronic infections and promoting mucosal healing [5].

Conclusion

Ongoing research is focused on further elucidating the mechanisms of HBOT and expanding its clinical applications within otorhinolaryngology. Optimal treatment protocols determine the most effective pressure and duration settings for various ENT conditions. Combination therapies explore synergistic effects of HBOT with pharmacological treatments, such as corticosteroids and antibiotics. Biomarker development patient response and tailor individualized HBOT regimens. Hyperbaric oxygen therapy represents a valuable adjunctive treatment modality in otorhinolaryngology, offering significant benefits for conditions such as sudden sensorineural hearing loss, osteoradionecrosis, compromised grafts and flaps, chronic otitis media, and tinnitus. Its efficacy is grounded in its ability to enhance tissue oxygenation, promote healing, and exert anti-inflammatory and antimicrobial effects. While generally safe, HBOT requires careful patient selection and monitoring to mitigate potential adverse effects. Continued research will further refine its applications and optimize treatment protocols, potentially expanding its role in the management of ENT disorders.

Acknowledgement

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Conflict of Interest

None.

References

1. Yamamoto, Naoki, Ryohei Takada, Takuma Maeda and Toshitaka Yoshii, et al. "Microcirculation and tissue oxygenation in the head and limbs during hyperbaric oxygen treatment." *Diving Hyperb Med* 51 (2021): 338.

2. Gul, Fatih, Togay Muderris, Gokhan Yalciner and Ergun Sevil, et al. "A comprehensive study of oxidative stress in sudden hearing loss." *Eur Arch Otorhinolaryngol* 274 (2017): 1301-1308.

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3. Meliante, Piero Giuseppe, Federica Zoccali, Francesca Cascone and Vanessa Di Stefano, et al. "Molecular pathology, oxidative stress and biomarkers in obstructive sleep apnea." *Int J Mol Sci* 24 (2023): 5478.

4. Benjafield, Adam V., Najib T. Ayas, Peter R. Eastwood and Raphael Heinzer, et al. "Estimation of the global prevalence and burden of obstructive sleep apnoea: A literature-based analysis." *Lancet Respir Med* 7 (2019): 687-698.

5. Truschel, Bill and Michael I. Polkey. "Optimizing tracheal oxygen tension and diffusion ratio when choosing high-flow oxygen therapy or cpap for the treatment of hypoxemic respiratory failure: Insights from *ex vivo* physiologic modelling." *J Clin Med* 12 (2023): 2878.

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