EFFECTS OF HYPERBARIC OXYGEN EXPOSURE ON EXPERIMENTAL HEAD AND NECK TUMOR GROWTH, OXYGENATION, AND VASCULATURE

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Abstract: *Background.* Hyperbaric oxygen (HBO_2) is used to promote healing in irradiated tissues, but concern persists about the possibility that it may promote residual tumor growth.

Methods. The tumor growth of SQ20B and Detroit 562 head and neck squamous cell carcinoma xenografts were studied after single-dose irradiation and 5×/week HBO_2 treatment at 2.4 atm absolute for 90 minutes. The effect of HBO_2 treatment on tumor hypoxia and vasculature was also examined by immunohistochemical analysis.

Results. HBO_2 treatment increased tumor oxygenation during the treatment interval but did not promote the growth of either irradiated or unirradiated tumors. No increase in tumor vascular endothelial growth factor expression or vascularization was detected.

Conclusions. This study found no evidence for persistent changes in tumor microenvironment or tumor growth promotion caused by hyperbaric oxygen exposure. © 2005 Wiley Periodicals, Inc. *Head Neck* **27:** 362–369, 2005

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The predominant use of hyperbaric oxygen (HBO_2) in the context of cancer therapy has been to improve healing of normal tissues after radiation injury or to promote surgical wound healing in a previously irradiated site (recently reviewed by Feldmeier and Hampson[1]). In particular, HBO_2 treatment is often used in patients with head and neck cancers who have received high doses of radiation and for whom further surgery or dental extraction is required. A proposed mechanism for the effect of HBO_2 on tissue healing is that it creates an oxygen gradient that promotes increased angiogenesis within the hypoxic irradiated tissue.[2,3] However, this raises a concern regarding the use of HBO_2 in the setting of cancer therapy, because such an effect would have the potential for promoting the growth of residual tumor. Several clinical case reports have described rapid progression of tumors occurring after HBO_2