

Effect of Hyperbaric Oxygenation on Existing Oral Mucosal Carcinoma.

McDonald, MD. Laryngoscope 106:Aug 1996, pp: 957-959.

Introduction

HBO therapy is used in head and neck cancer patients for the treatment of persistent infection or osteoradionecrosis or as an adjunct to reconstructive procedures. There was concern that recurrences might represent an effect of HBO in facilitating growth of existing clinically occult disease.

Previous research on the effect of HBO on tumour growth has yielded conflicting results. In some series and studies, HBO has seemed to promote tumour growth, while other reports show no initiating or promoting effect. The same dichotomy exists for evidence on the effect of HBO on distant metastasis rate.

In a prior study, HBO was administered during the induction of chemical carcinogenesis. Animals receiving HBO had fewer but larger tumours, suggesting that HBO discouraged carcinogenesis but enhanced the growth rate of an established tumour. The current study was designed to investigate the effect of HBO on an established tumour.

Materials and Methods

Oral squamous cell carcinoma was produced using an established model for chemical carcinogenesis. Animals had macroscopic tumours in the buccal pouches. Group 1 underwent no HBO therapy while Group 2 underwent twice daily HBO treatment to 2.81 ATA for 60 minutes, for a total of 30 dives. This is a typical course of treatment for osteoradionecrosis

Results

Neck metastasis developed in 5% of the HBO Group compared to 22% of the non-HBO Group. This was not statistically significant but appeared to *trend toward fewer neck metastasis in HBO-treated animals*. Tumour mass of non-HBO animals averaged 1.89g and was significantly greater. Tumour mass of HBO-animals averaged 0.86g

Discussion

This study demonstrated an apparent tumoricidal effect of the HBO. HBO-treated animals had *decreased tumour growth by more than 50%*

There was a *trend toward fewer nodal metastasis* in the HBO-treated animals but no difference between groups in the rate of distant metastasis.

The *anti-tumour effect* seen in these established oral squamous cell carcinomas may result from an HBO-induced increase in free-oxygen radicals. *HBO therapy increases tissue oxygen tension (from ambient ppO_2 to >2000 mm Hg), which in turn results in formation of peroxide, superoxide, and hydroxyl radicals. These free radicals destroy cell membranes, causing cell death. Thus, the HBO treatments may cause a local chemotherapeutic effect*

Patients that receive HBO treatment sometime after initial tumour treatment, the *recurrence rate drops to 10.5% for stage 1 and 36.3% for stage 4*. This finding suggests that *HBO treatment may offer protection against clinical tumour recurrence*.

A review of published information fails to support a cancer-causing or growth-enhancing effect by HBO.