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Hyperbaric Oxygen Therapy: An Adjunctive Modality for Accelerating Healing, Decreasing Pain and Improving Quality of Life in Patients with Hypoxic Radiated Areas

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Purpose and Objectives

Conducted by an Atlanta-based comprehensive outpatient rehabilitation facility, this retrospective evidence-based study explores the impact of hyperbaric oxygen (HBO₂) therapy in decreasing pain and improving the overall quality of life of patients with complications from radiation therapy.

Radiation damage is unique because of its slow, progressive nature and the effect of the gradual or diffused boundary between the normal and irradiated areas. Without adequate oxygen tension levels, the hypoxic area cannot assemble and deposit mature collagen. Death or necrosis of tissue devoid of functioning fibroblasts and osteoblasts can occur and can be irreversible by conventional treatment means. Healing may become suspended or halted. In these patients, multiple studies have demonstrated HBO₂'s effectiveness in restoring and accelerating the healing processes using pressurized oxygen as a drug.

In this study, HBO₂ therapy's effectiveness in decreasing pain and improving quality of life was evaluated in addition to traditional measures of accelerated healing.

Material and Methods

98 patients that experienced complications following radiation therapy to specific sites –head and neck (53), breast (8) and prostate (30) over a five-year period (2000-2005) were referred for adjunctive HBO₂ therapy. Patients were treated in a 31' Gulf Coast multi patient hyperbaric chamber. During each treatment, patients breathed 100 percent oxygen for 90 minutes at a pressure of 2.0 – 2.4 atmospheres absolute, resulting in a 10 to 15-fold increase in tissue oxygen levels. Patients were expected to undergo treatments five days per week (Monday-Friday).

HBO₂ treatment protocols varied depending on the location and severity of radiation complications. The median treatment number was 40 HBO₂ sessions over 67 days with the exception of the prostate patients who averaged 51 treatments over 83 days. Case appraisals were generated utilizing medical assessments, chart reviews, patient interviews, and a 10-point visual analog pain scale.

Results

In the 54 patients (37 males and 17 females) with chronic radiation damage to the head and neck, 41 (75%) showed vast improvement in healing and quality of life measures including the ability to eat and swallow fluids. Prior to HBO₂ therapy, 21 (39%) experienced pain. At the conclusion of HBO₂ treatment, pain was diminished or reduced in 15 cases. Five (9%) patients who expressed no improvement or a slight increase in pain had received HBO₂ to prepare for further surgery or a tracheostomy. One patient chose not to participate in treatment and two patients stopped their treatment for outside medical reasons. One patient is currently undergoing treatments for radiation damage to the neck region.

A significant reprise from pain, edema and erythema was shown in 7 of the 11 (64%) female patients with radiation damage to the breast. Following HBO₂ treatment, three patients successfully underwent reconstructive breast surgery. This supports HBO₂'s ability to fight soft tissue radionecrosis and infection and enhance the effectiveness of skin grafting and surgical procedures by increasing blood and oxygen levels.

Healing and pain reduction following a HBO₂ treatment course was shown in 25 of the 33 (76%) male patients with prostate radiation damage. Three patients currently are receiving treatments. Other clinical outcomes included resolved incontinence, reduced rectal inflammation and bleeding, decreased frequency of urination, and improved bladder wall hypervascularity.

Conclusion

Of the 98 case appraisals, 73 (75 %) showed a significant reduction or elimination of pain and increased levels of emotional and physical well-being from healing. The evidence-based patient data suggests that HBO₂ therapy is an effective treatment to decrease pain and improve quality of life issues often associated with radiation treatment. Clinicians should consider the benefit of adjunctive HBO₂ therapy along with other medical and surgical interventions for the estimated one to five percent of patients (potentially between 6,000 and 30,000 patients annually) who develop serious radiation complications.