

# Hyperbaric oxygen therapy effectively treats long-term damage from radiation therapy



**More than 11 million people living in the U.S.** today have been diagnosed with cancer, and about half of them have received radiation therapy (radiotherapy). While improved radiotherapy techniques have increased treatment precision and reduced side effects caused by radiotherapy, the high doses of radiation used to kill cancer cells may still cause long-term damage to nearby healthy cells in some patients. By helping the blood carry more oxygen to affected areas, hyperbaric oxygen therapy (HBOT) has been proven effective for these patients.

## Long-term side effects

For most cancer patients who experience negative effects from radiotherapy, the side effects are short-term and appear within six months of their last exposure to radiation. Depending on the patient's sensitivity to radiotherapy, the type and dose of treatment and location of the cancer, patients may experience scarring and narrowing of the blood vessels (intimal proliferation in the arterioles) within the treatment area. This can lead to inadequate blood supply and result in chronic, long-term side effects including death or damage to soft tissues or bones (necrosis, radionecrosis or osteoradionecrosis), poor wound healing and related problems such as life-threatening infections. As many as 10 to 15 percent of patients receiving high doses of radiotherapy will experience these late side effects from radiotherapy, which may be delayed for several months or years after treatment has ended.

## HBOT is last hope for many patients

“For the subset of patients who suffer from late effects of radiation exposure, hyperbaric oxygen therapy is often the only treatment that can prevent irreversible bone or tissue loss or enable them to undergo life-improving reconstructive procedures such as breast or facial surgeries,” explains Susan Sprau, M.D., a hyperbaric medicine specialist at UCLA. “By offering this therapy, we are able to provide a better quality of life to patients who have already survived devastating illnesses.”

Late side effects from radiotherapy result from scarring and narrowing of the blood vessels within the treatment area, which may lead to inadequate blood supply and cause necrosis of normal tissues and bones. Hyperbaric oxygen therapy (HBOT) helps blood carry more oxygen to affected areas and stimulates growth of new blood vessels by exposing patients to pure oxygen within a sealed chamber set at greater than the ambient atmospheric pressure. “Hyperbaric oxygen therapy is safe, non-invasive, effective and well-tolerated by appropriate patients,” says Dr. Sprau, “and hyperbaric treatment for radiation damage qualifies for Medicare reimbursement.”

## Hyperbaric oxygen therapy

HBOT has emerged as an effective treatment for some patients who previously had little hope of recovering from late side effects of radiotherapy. HBOT increases the amount of oxygen in the blood by exposing patients to pure oxygen within a sealed chamber set at pressures greater than the ambient atmosphere, with results that can be measured using a transcutaneous partial pressure oxygen (TCPO<sub>2</sub>) monitor before and after treatment. Experts believe HBOT helps patients by stimulating growth of new blood vessels following radiation-induced damage.

HBOT has the longest history of success in treating or preventing damage to the jaw bone resulting from radiation treatment, but has also been effectively used to treat radiation-induced damage to the head, neck, chest wall, abdomen and pelvis. For example, HBOT may prevent tooth loss or collapse of the jaw bone in patients previously treated for head or neck cancers, promote successful skin grafts or flaps following reconstructive surgery in patients treated for breast cancer, and eliminate persistent urinary bleeding (radiation cystitis) in patients treated for prostate cancer.

HBOT usually spans multiple sessions lasting approximately 100 minutes each, depending on the treatment protocol. During HBOT, patients may experience ear popping, mild sinus discomfort or claustrophobia. Other rare side effects include temporary short-sightedness (myopia) and pulmonary oxygen toxicity. Very rarely, oxygen toxicity induces seizures. Most patients do not experience any symptoms immediately after HBOT and can return to work the day of treatment. Some patients, however, may experience temporary changes in vision when completing more than 20 HBOT sessions.

Contraindications for HBOT include high fever, untreated seizure disorder and untreated air or gas in the pleural space of the lung, which causes the lung to collapse (pneumothorax). Pregnancy is a relative contraindication to HBOT.

## Research supports HBOT for approved uses

HBOT has been proven an effective treatment for certain conditions by a number of clinical studies<sup>1</sup>. The UCLA Gonda Center for Wound Healing and Hyperbaric Medicine provides HBOT for only these conditions, which have also been approved for reimbursement by Medicare. Most health insurance policies cover medically approved uses of HBOT.

- Radiation injuries
- Preservation of skin flaps or grafts
- Diabetic foot not responding to conservative therapy
- Gas gangrene
- Decompression sickness
- Air or gas embolism
- Carbon monoxide poisoning
- Acute traumatic peripheral ischemia
- Severe untreated anemia
- Intracranial abscess
- Problem wounds
- Necrotizing soft tissue infections
- Chronic refractory osteomyelitis

<sup>1</sup> Undersea and Hyperbaric Medical Society, www.uhms.org, accessed August 2009

## Participating Physicians

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