Healing with Hyperbaric Oxygen Therapy

Chronic wounds heal faster with Hyperbarics

Some people develop sores or wounds that just won't heal. This may be due to low oxygen in damaged tissues. HBOT restores the body's ability to heal the wound by increasing oxygen to the area.

HBOT Speeds Up The Healing Process in Smokers
People who smoke do not heal as well as non smokers. HBOT can help smokers undergoing some types of surgeries such as cosmetic surgery heal more normally.

Burn Victims Improve With Hyperbaric Oxygen
HBOT has been used for years to speed up healing in burn victims. It is also beneficial for patients with smoke inhalation and carbon monoxide poisoning.

Diabetic Ulcers Heal Faster With Hyperbaric Oxygen
Diabetes is a disease that affects the small blood vessels in the tissues which results in wounds or ulcers that may last months to years. These wounds often develop from incidental injuries to the body and may become infected which can spread to the deeper tissues and the bones and may even require amputation. HBOT can help heal these wounds frequently without surgery.

Damaged Tissues from Cancer / Radiation Therapy Improve with Hyperbaric Oxygen HBOT can restore tissues and cells damaged from chemotherapy and radiation treatments in cancer patients. Head, neck and other cancer treatments that damage the jaw bone may require HBOT to restore the tissues. Side effects of cancer therapy may cause damage to the bladder (hemorrhagic cystitis), damage to the intestines (radiation enteritis) and other conditions that may be improved by HBOT. Breast cancer patients undergoing reconstruction may need HBOT to allow radiation damaged tissues to heal.

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Hyperbaric Oxygen Therapy

(Letter to the Editor)
Author/s: Charlotte Coles

Combination with radiotherapy in cancer is of proved benefit but rarely used

EDITOR--Leach et al discuss various clinical applications of hyperbaric oxygen therapy.[1] They conclude that the use of hyperbaric oxygen should be evidence based, but their article omits an important and much researched clinical use--combined radiotherapy and hyperbaric oxygen in patients with cancer.

Hyperbaric oxygen was first used 50 years ago to increase cellular oxygen delivery and thus overcome hypoxia as a cause of tumour radioresistance. The Medical Research Council coordinated several large multicentre trials. Significant benefit was found in both locoregional tumour control and survival in head and neck cancer[2] and carcinoma of the uterine cervix.[3] A meta-analysis of combined hyperbaric oxygen and radiotherapy reviewed 19 trials in tumours at various sites with a total of 2488 patients.[4] Locoregional control with the combined modality was 62%, versus 53% with radiotherapy alone (P [is less than] 0.0001). Subgroup analysis showed that the greatest improvement in local control and survival occurred in head and neck cancer.

This scientifically proved application of hyperbaric oxygen is now unused.
It was initially hoped that chemical radiosensitisers would substitute for hyperbaric oxygen and so simplify treatment, because animal studies had generated considerable optimism; clinical trials, however, showed only marginal therapeutic gain.

Other evidence based developments in radiotherapy have not been implemented.
Recent trials of altered radiotherapy fractionation have shown increased local control and survival in some tumours.[5] The head and neck hyperfractionation trial of the European Organisation for Research and

Treatment of Cancer showed a 19% absolute (47.5% relative) increase in local control and consequent increase in survival. In non-small cell lung cancer a 9% absolute improvement in survival was obtained with continuous hyperfractionated accelerated radiotherapy.

These strategies are largely neglected in the United Kingdom because of a lack of radiotherapy resources. The Faculty of Clinical Oncology's report on radiotherapy in 1992 7 shows large inequalities in service provision, with unacceptable delays before radiotherapy is started. To provide an acceptable minimum of four linear accelerators per million population, capital investment of 50[pounds sterling] million a year for five years is required, with commitment to the revenue cost of trained staff. This should be a stated target of the NHS modernisation fund.

Radiotherapy is the most important nonsurgical modality in the curative treatment of cancer, yet it is underused in the United Kingdom because of a lack of resources. At present, evidence based practice in radiotherapy is unachievable.

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Complication rates are much lower than authors suggest

EDITOR-
We would be interested to know where Leach et al obtained their figures for complication rates of hyperbaric oxygen therapy[1]; our practice and that of others suggest that they are pessimistic.

Our unit provides over 2700 treatments with hyperbaric oxygen in about 250 patients each year for a range of indications, including problem wounds, decompression illness, and carbon monoxide poisoning. According to Leach et al, we should expect two to five patients with severe central neurological symptoms and 38 patients with symptomatic barotrauma or pulmonary symptoms each year. In fact, during 1997 one patient had an oxygen toxic fit, 18 had symptomatic barotrauma, and one had symptoms of severe pulmonary toxicity.

Over the past three years the incidence of central neurological toxicity has been 0.5% (three patients) and of symptomatic barotrauma 7% (49 patients).

We accept that many patients have minor measurable changes in respiratory function, but these are rarely symptomatic and not clinically important. A report of the international hyperbaric incident monitoring study running from the Royal Adelaide Hospital suggests figures of [is less than] 1% (seven patients) for neurological toxicity and [is less than] 10% (21 patients) for barotrauma overall.[2] Others have

produced comparable figures.[3 4] Patients are unlikely to develop decompression illness after hyperbaric oxygen therapy (as suggested by Leach et al) unless given air for prolonged periods. To our knowledge this has never been reported, although it is certainly a risk for staff breathing air.

Fire is the most common fatal complication. Over the past 20 years, with millions of compressions in clinical hyperbaric chambers, 52 deaths have been reported.[5] Almost all were preventable; 35 were in one country and due to inadequate precautions. In particular, 10 incidents resulting in 20 deaths occurred when banned substances (including lighted cigarettes) were taken into the chamber. Many treatment modalities and drugs could benefit from a safety record as good as that for modern hyperbaric medicine.

Safety figures are meaningless in the absence of therapeutic benefit, and evidence based admission and discharge criteria are essential for decision making. We strive to achieve evidence based practice but at present must rely on relatively low levels of evidence for many clinical decisions.

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Authors' reply

EDITOR-
It was not our intention to neglect the value of hyperbaric oxygen therapy in the management of certain tumours. Our article acknowledges the advantages of hyperbaric over normobaric oxygen in promoting angiogenesis and wound healing in irradiated tissue. In particular, we reported the value of preoperative and postoperative hyperbaric oxygen in the prevention of soft tissue radionecrosis and osteonecrosis during treatment of local head and neck turnouts requiring local mandibular radiotherapy.

Coles et al comment that combined radiotherapy and hyperbaric oxygen in the management of cancer, although of proved benefit, is not generally in common use. As they report, there are several reasons for this, not least of which are the cost and resource implications and the practical issues of delivering the two treatments simultaneously. They also suggest that available radiotherapy resources are unlikely to be directed towards the use of combined radiotherapy and hyperbaric oxygen in the near future. In our

brief article, which was for a non-specialist readership, we did not have enough space to give a detailed cost-benefit analysis or an explanation of why a proved treatment was not used. The lack of resources in radiotherapy and oncology is a problem currently affecting many specialties.

The complication rates for hyperbaric oxygen therapy that we quoted were derived from studies and review articles published during the past 25 years. Complication rates in individual studies primarily depend on the definition of a severe complication, and this is likely to account for some of the variability between studies. Many of the early, small studies quote complication rates higher than those reported in our article.[1-4] Although recent complication rates are lower, the data from these early studies should not be dismissed. We hope that Trytko and Bennett will publish the data on their complication rates in peer reviewed form.

Finally, although the risk of decompression illness is small and likely to affect only staff breathing air, it still warrants mention in a list of risks of hyperbaric oxygen. Potential injuries to staff, as during the small number of associated fires, should be included in a list of risks of the treatment.

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