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Hyperbaric oxygen and malignancies: a potential role in radiotherapy, chemotherapy, tumor surgery and phototherapy.

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Over the past 40 years, hyperbaric oxygen (HBO(2)) therapy has been recommended and used in a wide variety of medical conditions. In the 1950s, HBO(2) was first used as a treatment, in addition to radiation, for head and neck cancers and cervical cancer. Many studies have been conducted to investigate possible therapeutic effects HBO(2) as part of cancer management. Evidences showed that HBO(2) improved tumor oxygenation, and treatment with HBO(2) during irradiation has been shown to improve the radiation response of many solid tumors. It was used for delayed radiation injuries for soft tissue and bony injuries, for symptomatic radiation reactions of the urinary bladder and the bowel, for laryngeal radionecrosis, for radiation-induced optic neuropathy, for radiation-induced proctitis and for radiation-induced necrosis of the brain. HBO(2) also increases sensitivity to chemotherapy. A significant improvement in tumor response was obtained when photodynamic therapy (PDT) was delivered during hyperoxygenation. These studies were extensively reviewed and rational scientific basis for further investigations was discussed. The possibility of combining HBO(2), PDT and photosezitzers to overcome primary and secondary carcinoma deserve extensive laboratory and clinical research works. HBO(2) is a relatively benign with few contraindications, even for active cancer patients.