

A combination of radiotherapy, nitric oxide and a hyperoxygenation sensitizing protocol for brain malignant tumor treatment.

MED 07-03 200717069987 [NDN- 230-0585-5611-2](#)

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JOURNAL NAME- Med Hypotheses

VOLUME 68

NUMBER 3

PUBLICATION DATE- 2007

PP 528-37

DOCUMENT TYPE- Journal Article

JOURNAL CODE- 7505668

JOURNAL SUBSET- MEDJSIM

ISSN- 0306-9877

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PUBLICATION COUNTRY- Scotland

LANGUAGE- English

Brain malignant tumor such as glioblastoma is a challenging medical and surgical problem. In spite of surgery, radiotherapy and chemotherapy, the prognosis is still very poor. The limitations of currently available treatment modalities to cure or significantly prolong and improve the quality of life should stimulate rigorous research and studies to combat brain malignant tumors. While precision radiotherapy to reduce tumor size and ameliorate symptoms is still the standard of care, tumor sensitivity to radiation is compromised by low oxygen tensions and a necrotic tumor center. We propose to take advantage of the fact that elevated oxygen increases sensitivity of tumor cells to radiation. A specific application of hyperbaric oxygen (HBO(2)), using nitric oxide (NO) donors and inducers (such as l-arginine, dinitrite or tocopheryl succinate) and ascorbic acid to dilate blood vessels, should permit oxygen tensions in the range of 1000mmHg to diffuse into the cells and thus increase sensitivity to radiation. This should permit doses that are low enough to cause the death of tumors cells yet minimize injury to brain tissue near the tumor and induced neurological sequelae.