Effects of Hyperbaric Oxygen on Growth and Lung Metastasis of Murine Osteosarcoma Cell

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Introduction: Osteosarcoma is the most common primary malignant bone tumor. Recently adjuvant chemotherapy and surgical treatment improves a survival rate. Despite approximately 30% of patients suffer from recurrence with metastasis mostly in the lung. Therefore, a new regimen is required. Hyperbaric oxygen (HBO) has been used to treat a variety of conditions including non-healing wounds, carbon monoxide poisoning, and as an adjuvant to radiotherapy or chemotherapy. Several clinical trials are found here and there. In this report, HBO is examined as an adjuvant to chemotherapy and as a standalone treatment.

Materials and Methods: In vitro, Mouse osteosarcoma (LM8) cell grown under normoxic conditions were exposed to 60 minutes under HBO (2.5 atmospheres, 100% O2) or normal pressure air. After then, carboplatin (CBDCA) was added. Cell viability was determined by the MTT assay. In Vivo, C3H mice were subcutaneously inoculated with 5 x 10^6 LM8 cells and divided into four groups. Group 1 served as controls. Group 2 was exposed to HBO at 2.5 atmospheres absolute pressure for 60 minutes, 5 days a week. Group 3 received weekly intraperitoneal carboplatin (50mg/kg). Group 4 treated with HBO plus carboplatin. In the meantime tumor size and survival number was measured. After 5 weeks, mice were sacrificed and metastatic foci on the lung were counted.

Results: HBO plus CBDCA produced significantly greater cytolyis than did CBDCA alone. HBO also delayed tumor growth and decreased the number of lung metastases. Survival rate was also improved compared with control.

Discussion: This study shows that HBO can reduce the rate of tumor growth, and lung metastasis in mouse osteosarcoma cells. HBO will be a new option for the treatment of osteosarcoma as a neoadjuvant chemotherapy.


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