

Effects of the combination of hyperbaric oxygen and 5-fluorouracil on proliferation and metastasis of human nasopharyngeal carcinoma CNE-2Z cells.

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Abstract

OBJECTIVE: We investigated the effects of hyperbaric oxygen (HBO₂) and/or 5-fluorouracil (5-FU) on the proliferation and metastasis of human nasopharyngeal carcinoma (NPC) cell line CNE2Z and the underlying mechanisms involved.

METHODS: Nasopharyngeal carcinoma (NPC) CNE2Z cells were randomly divided into four groups: Group A: control group; Group B: 5-FU group; Group C: HBO₂ group; Group D: 5-FU plus HBO₂ group. The inhibitory effects on CNE2Z cells proliferation in the four groups after 24, 48 and 72 hours of treatment were measured by MTT-colorimetric method. Transwell chamber assay was performed to determine the effects of HBO₂ and/or 5-FU on the metastasis of CNE2Z cells; Expressions of MMP-9 and VEGF in CNE2Z cells were detected by immunocytochemical staining.

RESULT: A significant difference was observed in the inhibitory effects on CNE2Z cell proliferation (OD values) between the 5-FU group (Group B) and the control group (Group A) after 24, 48, and 72 hours of treatment ($p < 0.01$); between the HBO₂ group (group C) and the control group (Group A) after 48 and 72 hours of treatment ($p < 0.01$); and between the HBO₂ plus 5-FU group (Group D) and the control group (Group A) as well as the HBO₂ plus 5-FU group (Group D) and the HBO₂ group (Group C) after 24, 48, and 72 hours of treatment ($p < 0.01$). But a significant difference between the HBO₂ plus 5-FU group (Group D) and the 5-FU group (Group B) was observed only after 48 hours of treatment ($p = 0.030$). As for metastasis, as well as MMP-9 and VEGF expression OD values, significant difference was observed between the 5-FU group (Group B) and the control group (Group A) with $p < 0.05$, but not between the HBO₂ group (Group C) and the control group (Group A). Although effects on metastasis as well as MMP-9 and VEGF expression OD values were significantly different between the 5-FU plus HBO group (group D) and group A ($p < 0.01$), no difference was observed between Group D and Group B as well as Group D and Group C.

CONCLUSIONS: Simple HBO₂ treatment after 48 and 72 hours could inhibit the proliferation of nasopharyngeal carcinoma CNE2Z cells. The combination of HBO₂ with 5-FU exhibited significant synergism in the suppression of NE2Z cell proliferation only after 48 hours of treatment compared to 5-FU. Simple HBO₂ treatment could not reduce the high expressions of MMP-9 and VEGF and inhibit the metastasis of human NPC CNE2Z cells, and no synergistic effect was observed for the combination of HBO₂ with 5-FU compared to 5-FU alone.

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