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**Boron neutron capture therapy for newly diagnosed glioblastoma: A pilot study in Tsukuba.**

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Neutron capture therapy (NCT) theoretically allows an unique tumor-cell-selective high-LET particle radiotherapy. The survival benefits and safety of NCT were evaluated in 15 patients with newly diagnosed glioblastoma multiforme (GBM). Seven patients received intra-operative (IO-) NCT and eight patients received external beam (EB-) NCT. Sulfhydryl borane (BSH, 5g/body) was administered intravenously 12h before neutron irradiation. Additionally, p-dihydroxyboryl-phenylalanine (BPA, 250mg/kg) was given 1h before irradiation to the eight patients who underwent EB-NCT. EB-NCT was combined with fractionated photon irradiation. Five of 15 patients were alive at analysis for a mean follow-up time of 20.3M. In 11 of 15 patients followed up for more than 1-year, eight (72.7%) maintained their Karnofsky performance status (KPS; 90 in 6 and 100 in 2). The median overall survival (OS) and time to magnetic resonance (MR) change (TTM) for all patients were 25.7 and 11.9M, respectively. There was no difference in TTM between the IO-NCT (12.0M) and EB-NCT (11.9M) groups. The 1- and 2-year survival rates were 85.7% and 45.5%, respectively. This NCT pilot study in 15 patients with newly diagnosed GBM showed survival benefits, suggesting that the neutron capture reaction may function sufficiently to control tumors locally, and that further optimized studies in large series of patients are warranted.

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