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Abstract

High prognostic potential of glioblastoma stem cell analysis

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Background: Cancer stem cells (CSCs) are a rare cell population responsible for tumor development and maintenance. Recent studies have shown that glioblastoma stem cells express the CD133 marker and are resistant to radiotherapy and chemotherapy. However, clinical data based on the study of CSCs in patients with glioblastoma are not available yet.

Methods: Glioblastoma samples from 44 patients treated with complete or partial tumorectomy, followed by radiotherapy and temozolomide were prospectively analyzed. Immunohistochemistry was performed to evaluate the prognostic value of the number of CD133+ cells present in tumors. Moreover, the relationship between the ability to generate long-term culture of tumorigenic cells *in vitro* and the clinical outcome of glioblastoma patients was tested.

Results: CD133 expression did not show an overall prognostic value. CSC cultures were obtained from 14 of the 44 tumors (32%). The generation of CSCs emerged as significant independent prognostic factor by the Cox multivariate analyses, with an adjusted hazard ratio of 2.50 (95% CI, 1.04 to 6.06; P=0.004). The median overall survival among patients with tumors generating CSCs was 8.0 months (95% CI, 4.0 to 11.5), as compared with 15 months (95% CI, 11.0 to 19.0) among those without generation of CSCs (P=0.0002). The median progression-free survival was 3.5 months (95% CI, 2.0 to 6.0) for glioblastoma generating CSCs and 9.0 months (95% CI, 7.0 to 12.0) for glioblastoma not generating CSCs (P=0.0001). A higher CD133 expression significantly associated with tumors generating CSCs (P=0.006), and correlated with a higher risk of death in patients with tumors generating CSCs *in vitro* (hazard ratio of 1.65, 95% CI, 1.05 to 2.60; P=0.0285). **Conclusions:** Generation of long-term culture of tumorigenic CSCs *in vitro* from glioblastoma predicts a poor clinical outcome for patients, in terms of both overall and progression-free survival. In tumors generating CSCs, CD133 expression may have a prognostic value.

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[Abstract presentation from the 2007 ASCO Annual Meeting](#)

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