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Serum GFAP is a diagnostic marker for glioblastoma multiforme.

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Abstract

A serum marker for malignant cerebral astrocytomas could improve both differential diagnosis and clinical management of brain tumour patients. To evaluate whether the serum concentration of glial fibrillary acidic protein (GFAP) may indicate glioblastoma multiforme (GBM) in patients with single supratentorial space-occupying lesions, we prospectively examined 50 consecutive patients with histologically proven GBM, World Health Organization (WHO) grade IV, 14 patients with anaplastic astrocytoma (WHO grade III), 4 patients with anaplastic oligodendroglioma, 13 patients with diffuse astrocytoma (WHO grade II), 17 patients with a single cerebral metastasis and 50 healthy controls. Serum was taken from the patients before tumour resection or stereotactic biopsy. Serum GFAP levels were determined using a commercially available ELISA test and were detectable in 40 out of the 50 GBM patients (median: 0.18 microg/l; range: 0-5.6 microg/l). The levels were significantly elevated compared with those of the non-GBM tumour patients and healthy controls (median: 0 mug/l; range: 0-0.024 microg/l; $P < 0.0001$, respectively). Non-GBM tumour patients and all healthy subjects showed zero serum GFAP levels. There was a significant correlation between tumour volume (Spearman Rho, $CC = 0.47$; 95% confidence interval, 0.2-0.67; $P < 0.001$), tumour necrosis volume ($CC = 0.49$; 95% confidence interval, 0.2-0.72; $P = 0.004$), the amount of necrotic GFAP positive cells ($CC = 0.61$; 95% confidence interval, 0.29-0.81; $P = 0.007$) and serum GFAP level among the GBM patients. A serum GFAP level of >0.05 microg/l was 76% sensitive and 100% specific for the diagnosis of GBM in patients with a single supratentorial mass lesion in this series. Therefore, it can be concluded that serum GFAP constitutes a diagnostic biomarker for GBM. Future studies should investigate whether serum GFAP could also be used to monitor therapeutic effects and whether it may have a prognostic value.

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