# Stereotactic biopsy of high-grade glioma

A prospective study of patients undergoing computerized tomography (CT)-guided stereotactic biopsy of nonpolar tumors in the dominant hemisphere was undertaken to determine if stereotactic biopsy caused a deterioration of language functions. Language was assessed using the Western Aphasia Battery (WAB) and the Boston Naming Test (BNT) before and after a biopsy sample was obtained. Of 16 patients studied, five (31%) were dysphasic preoperatively. After the biopsy the Aphasia Quotient (AQ), derived from the WAB, had significantly deteriorated in four (80%) of these patients, whereas in the fifth it remained relatively unchanged. One of these patients with an extensive infiltrating hemispheric oligoastrocytoma subsequently recovered normal language function after radiotherapy. In 10 of the 11 patients who had normal language function preoperatively there were no deleterious changes after biopsy in either the WAB subtest or BNT scores. In the other patient whose WAB score was normal preoperatively, there was a significant deterioration in postoperative AQ. This patient, who declined steroid therapy before and after biopsy, had a glioblastoma multiforme in Wernicke's area. A postoperative CT scan revealed no changes from what was shown on preoperative scan. This clinical study shows that CT-guided stereotactic biopsy of nonpolar tumors in the dominant hemisphere using the Brown-Roberts-Wells system and the Sedan-Nashold biopsy cannula carries a 9% risk (95% confidence intervals 0-26%) of impairing language functions if the patient is not dysphasic preoperatively. If the patient is dysphasic preoperatively, there is a very high risk of aggravating the dysphasia with stereotactic biopsy [1)].

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Twenty-seven patients underwent 29 computerized tomography (CT)-guided stereotactic biopsy procedures for untreated or recurrent malignant astrocytomas. Biopsies were obtained from the hypodense center, enhancing margin, and hypodense periphery as seen on contrast-enhanced CT scans, with diagnostic yields of (number of biopsies yielding tumor/number of biopsies obtained): 34/61 (56%), 68/101 (67%), and 8/22 (36%) from these three zones, respectively. Although tumor was identified in all three zones, diagnostic yield was significantly higher in the hypodense center and enhancing margin. Comparison of patients with untreated tumors to those with recurrent tumors demonstrated no statistical difference in tumor distribution, although there was a trend toward a higher yield from the hypodense periphery in the recurrent tumor group. Tumor was found up to 15 mm beyond the CT-enhancing margin, in addition to extending beyond the area of abnormality on T2-weighted magnetic resonance images. These findings suggest that serial stereotactic biopsies should be targeted to the hypodense center and enhancing margin for improved diagnostic yield. Biopsy material obtained from the hypodense periphery that demonstrates tumor also indicates that a tumor volume beyond the confines of the CT-enhancing margin should be considered when calculating dosimetry for interstitial radiation [2)].

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For many patients with malignant gliomas in inaccessible or functionally important locations, stereotactic biopsy followed by radiation therapy (RT) may be a more appropriate initial treatment than craniotomy and tumor resection. We studied the long term survival in 91 consecutive patients with malignant gliomas diagnosed by stereotactic biopsy: 64 had glioblastoma multiforme (Glioblastoma) and 27 had anaplastic astrocytoma (AA). Sixty-four per cent of the Glioblastomas and 33% of the AAs involved deep or midline cerebral structures. The treatment prescribed after biopsy, the tumor location, the histological findings, and the patient's age at presentation (for AAs) were statistically important factors determining patient survival. If adequate RT (tumor dose of 5000 to

6000 cGy) was not prescribed, the median survival was less than or equal to 11 weeks regardless of tumor histology or location. The median survival for patients with deep or midline tumors who completed RT was similar in AA (19.4 weeks) and Glioblastoma (27 weeks) cases. Histology was an important predictor of survival only for patients with adequately treated lobar tumors. The median survival in lobar Glioblastoma patients who completed RT was 46.9 weeks, and that in lobar AA patients who completed RT was 129 weeks. Cytoreductive surgery had no statistically significant effect on survival. Among the clinical factors examined, age of less than 40 years at presentation was associated with prolonged survival only in AA patients. Constellations of clinical features, tumor location, histological diagnosis, and treatment prescribed were related to survival time [3].

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