

DETERMINANTS OF FUNCTIONAL LOSS IN PATIENTS WITH GLIOMA IN ELOQUENT AREAS: A PRE- AND POSTOPERATIVE FMRI STUDY

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Introduction: Patients with brain tumors often do not show severe clinical disturbances at the time of diagnosis even with lesions in eloquent areas. The postoperative outcome of patients with gliomas located in the pericentral cortex often remains unpredictable. We aimed to better define the temporal dynamics in the activation profile between those patients with good and worse functional outcome comparing pre- and post-operative high-field-functional magnetic resonance imaging (fMRI). Methods: Nine right-handed patients (mean age 43.3y, 2f/7m) affected by high-grade gliomas growing within or adjacent to Rolandic cortex underwent fMRI on a 3-T scanner before surgery and around 12 days later. Functional data were analyzed using the Statistical Parametric Mapping program SPM99 software ($p < 0.001$). Neurological outcome was assessed using the Medical Research Council muscle testing scale. Results: Preoperatively, all patients with good functional outcome (either first presentation or long history and multiple surgeries) showed bilateral and symmetrical motor cortical activations in the primary sensorimotor and dorsal premotor cortices as well as SMA during finger movements of both hands. However, unilateral activation was the consistent finding in patients with poor outcome. After surgery we found diverse interindividual activation patterns, but few intraindividual differences between the pre- and postoperative scans. Conclusion: Bilateral motor activation may be the correlate for compensatory recruitment of additional areas with corticospinal projections and a predictor for better functional outcome. Not so much the cortical extent of the tumor or resection was the decisive factor for outcome but moreover the subcortical depth of the infiltration or excision.