363 Cortical Plasticity of Motor-Eloquent Areas Measured by Navigated Transcranial Magnetic Stimulation in Glioma Patients.

Abstract:
Better understanding of the mechanisms behind cerebral plasticity, coupled with noninvasive detection of its presence, harbors a huge potential to improve glioma therapy. Our aim was to demonstrate the frequency of plastic reshaping, find the patterns behind it, and prove that it can be recognized noninvasively using navigated transcranial stimulation (nTMS). We used nTMS to map cortical motor representation in 22 patients with gliomas affecting the precentral gyrus immediately preoperatively, and 3 to 42 months postoperatively. Location changes of the primary motor area, defined as hotspots and map centers of gravity, were measured. Spatial normalization of nTMS and MRI data showed an average primary motor area shift of 4.7 ± 0.8 mm standard error of the mean (SEM) on the mediolateral axis, and 9.7 ± 1.5 mm SEM on the anteroposterior axis. Motor-eloquent points tended to shift toward the resection cavity by 4.5 ± 3.6 mm SEM if the lesion was anterior to the rolandic region and by 2.6 ± 3.4 mm SEM if it was located more posteriorly. Overall, 8 of 16 (50%) high-grade and 3 of 6 (50%) low-grade glioma patients showed a functional shift of over 10 mm at the cortical surface level. Despite the series' small size, analysis of these data shows impressively that cortical functional reorganization occurs quite frequently. Moreover, nTMS is shown to detect such plastic reorganization.
noninvasively. However, because tumor- and deficit-related subgroups might show different patterns, multicentric analysis of a larger cohort seems compulsory. This provides further motivation to join our newly founded multicentric international study group.