

Perirolandic tumor

In patients with gliomas that are located within or adjacent to the rolandic cortex and, thus, the descending motor tracts, stimulation mapping of subcortical pathways enables the surgeon to identify these descending motor pathways during tumor removal and to achieve an acceptable rate of permanent morbidity in these high-risk functional areas ¹⁾.

Eight patients suffering from perirolandic tumors were preoperatively studied with MRI and navigated transcranial magnetic stimulation (nTMS). Afterwards, the MRI was automatically transformed into brain surface reformatted imaging (BSRI) in neuronavigation software (Brainlab, Brainlab AG, Feldkirchen, Germany). One experienced neuroradiologist, one experienced neurosurgeon, and two residents determined hand representation areas ipsilateral to each tumor on two-dimensional (2D) MR images and on BSR images. All results were compared to results from intraoperative direct cortical mapping of the hand motor cortex and to preoperative nTMS results.

Findings from nTMS and intraoperative direct cortical mapping of the hand motor cortex were congruent in all cases. Hand representation areas were correctly determined on BSR images in 81.3 % and on 2D-MR images in 93.75 % ($p = 0.26$). In a subgroup analysis, experienced observers showed more familiarity with BSRI than residents (96.9 vs. 84.4 % correct results, $p = 0.19$), with an equal error rate for 2D-MRI. The time required to define hand representation areas was significantly shorter using BSRI than using standard MRI (mean 27.4 vs. 40.4 s, $p = 0.04$).

With BSRI, a new method for neuronavigation is now available, allowing fast and easy intraoperative localization of distinct brain regions ²⁾.

¹⁾

Keles GE, Lundin DA, Lamborn KR, Chang EF, Ojemann G, Berger MS. Intraoperative subcortical stimulation mapping for hemispherical perirolandic gliomas located within or adjacent to the descending motor pathways: evaluation of morbidity and assessment of functional outcome in 294 patients. *J Neurosurg.* 2004 Mar;100(3):369-75. PubMed PMID: 15035270.

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Forster M, Heindl N, Hattingen E, Gessler F, Quick J, Seifert V, Senft C. Brain surface reformatted imaging (BSRI) for intraoperative neuronavigation in brain tumor surgery. *Acta Neurochir (Wien).* 2015 Jan 8. [Epub ahead of print] PubMed PMID: 25567079.

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