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.

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Abstract

OBJECT: Intraoperative stimulation mapping of subcortical white matter tracts during the resection of gliomas has become a valuable surgical adjunct that is used to reduce morbidity associated with tumor removal. The purpose of this retrospective analysis was to assess the morbidity and functional outcome associated with this method, thus allowing the surgeon to predict the likelihood of causing a temporary or permanent motor deficit.

METHODS: In this study, the authors report their experience with intraoperative stimulation mapping to locate subcortical motor pathways in 294 patients who underwent surgery for hemispheric gliomas within or adjacent to the rolandic cortex. Data were collected regarding intraoperative cortical and subcortical stimulation mapping results, along with the patient's neurological status pre- and postoperatively. For patients in whom an additional motor deficit occurred postoperatively, its evolution was examined. Of 294 patients, an additional postoperative motor deficit occurred in 60 (20.4%). Of those 60, 23 (38%) recovered to their preoperative baseline status within the 1st postoperative week. Another 12 (20%) recovered from their postoperative motor deficit by the end of the 4th postoperative week, and 11 more recovered to their baseline status by the end of the 3rd postoperative month. Thus, 46 (76.7%) of 60 patients with postoperative motor deficits regained their baseline function within the first 90 days after surgery. The remaining 14 patients (4.8% of the entire study population of 294) had a persistent motor deficit after 3 months. Patients whose subcortical pathways were identified with stimulation mapping were more prone to develop an additional (temporary or permanent) motor deficit than those in whom subcortical pathways could not be identified (27.5% compared with 13.1%, p = 0.003). This was also true when additional (permanent) motor deficits lasted more than 3 months (7.4% when subcortical pathways were found, compared with 2.1% when they were not found; p = 0.041).

CONCLUSIONS: 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.

Comment in

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