Preoperative motor mapping by navigated transcranial magnetic brain stimulation improves outcome for motor eloquent lesions.

Navigated transcranial magnetic stimulation (nTMS) has been proven to influence surgical indication and planning. Yet there is still no clear evidence how these additional preoperative functional data influence the clinical course and outcome. Thus, this study aimed to compare patients with motor eloquently located supratentorial lesions investigated with or without preoperative nTMS in terms of clinical outcome parameters. A prospectively enrolled cohort of 100 patients with supratentorial lesions located in motor eloquent areas was investigated by preoperative nTMS (2010-2013) and matched with a control of 100 patients who were operated on without nTMS data (2006-2010) by a matched pair analysis. Patients in the nTMS group showed a significantly lower rate of residual tumor on postoperative MRI (OR 0.3828; 95% CI 0.2062-0.7107). Twelve percent of patients in the nTMS and 1% of patients in the non-nTMS group improved while 75% and 81% of the nTMS and non-nTMS groups, respectively, remained unchanged and 13% and 18% of patients in the nTMS and non-nTMS groups, respectively, deteriorated in postoperative motor function on long-term follow-up (P = .0057). Moreover, the nTMS group showed smaller craniotomies (nTMS 22.4 ± 8.3 cm²; non-nTMS 26.7 ± 11.3 cm²).
This work increases the level of evidence for preoperative motor mapping by nTMS for rolandic lesions in a group comparison study. We therefore strongly advocate nTMS to become increasingly used for these lesions. However, a randomized trial on the comparison with the gold standard of intraoperative mapping seems mandatory.