Repeated mapping of cortical language sites by preoperative navigated transcranial magnetic stimulation compared to repeated intraoperative DCS mapping in awake craniotomy.

Abstract:
Repetitive navigated transcranial magnetic stimulation (rTMS) was recently described for mapping of human language areas. However, its capability of detecting language plasticity in brain tumor patients was not proven up to now. Thus, this study was designed to evaluate such data in order to compare rTMS language mapping to language mapping during repeated awake surgery during follow-up in patients suffering from language-eloquent gliomas. Three right-handed patients with left-sided gliomas (2 opercular glioblastomas, 1 astrocytoma WHO grade III of the angular gyrus) underwent preoperative language mapping by rTMS as well as intraoperative language mapping provided via direct cortical stimulation (DCS) for initial as well as for repeated Resection 7, 10, and 15 months later. Overall, preoperative rTMS was able to elicit clear language errors in all mappings. A good correlation between initial rTMS and DCS results was observed. As a consequence of brain plasticity, initial DCS and rTMS findings only corresponded with the results obtained during the second examination in one out of three patients thus suggesting changes of language organization in two of our three patients. This report points out the usefulness but also the limitations of preoperative rTMS language
mapping to detect plastic changes in language function or for long-term follow-up prior to DCS even in recurrent gliomas. However, DCS still has to be regarded as gold standard.