

Meta-Analysis

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# Comparative efficacy of awake and asleep motor mapping in glioma surgery: A meta-analysis of 3011 patients

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## Abstract

Standard of care in glioma surgery involves maximal-safe resection. Intraoperative stimulation mapping can improve the extent of resection in eloquent area tumors. Resection is performed during awake craniotomy (AC) or under general anesthesia (GA). Considering the advances in glioma management, an updated meta-analysis is needed. We identified studies evaluating surgical outcomes in adult patients undergoing glioma resection in motor areas, comparing AC and GA mapping until November 2023. Twenty-four observational studies and one randomized controlled trial met our inclusion criteria, adding 3011 patients. The mean extent of resection was 92.2% (95%CI = 89.9%-94.5%) for AC and 92.5% (95%CI = 89.6%-95.3%) for GA. Immediate deficit revealed a nonsignificant risk ratio (RR) of 0.96 favoring AC (95%CI = 0.66-1.41,  $p = 0.84$ ). Similarly, long-term deficits showed a nonsignificant RR of 1.33 favoring GA (95%CI = 0.91-1.95,  $p = 0.14$ ). Karnofsky performance score (KPS) analysis revealed a nonsignificant mean difference of 2.32 favoring GA (95%CI = -6.10-10.73,  $p = 0.59$ ). Intraoperative stimulation-induced seizures analysis yielded a nonsignificant RR of 0.73 (95% CI = 0.27-1.97,  $p = 0.53$ ) favoring AC. Postoperative seizure analysis showed a significant RR of 0.64 (95% CI = 0.44-0.94,  $p = 0.02$ ) favoring AC. This meta-analysis suggests that AC and GA are comparable approaches to maximize extent of resection and achieve safe resection in eloquent glioma surgery. These findings can offer guidance to neurosurgeons in the decision-making process.

**Keywords:** Awake craniotomy; General anesthesia; Glioma surgery; Motor mapping; Neurosurgery.

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