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Awake Versus Asleep Craniotomy for Patients With Eloquent Glioma: A Systematic Review and Meta-Analysis

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Abstract

Background and objectives: Awake vs asleep craniotomy for patients with eloquent glioma is debatable. This systematic review and meta-analysis sought to compare awake vs asleep craniotomy for the resection of gliomas in the eloquent regions.

Methods: MEDLINE and PubMed were searched from inception to December 13, 2022. Primary outcomes were the extent of resection (EOR), overall survival (month), progression-free survival (month), and rates of neurological deficit, Karnofsky performance score, and seizure freedom at the 3-month follow-up. Secondary outcomes were duration of operation (minute) and length of hospital stay (LOS) (day).

Results: Fifteen studies yielded 2032 patients, from which 800 (39.4%) and 1232 (60.6%) underwent awake and asleep craniotomy, respectively. The meta-analysis concluded that the awake group had greater EOR (mean difference [MD] = MD = 8.52 [4.28, 12.76], $P < .00001$), overall survival (MD = 2.86 months [1.35, 4.37], $P = .0002$), progression-free survival (MD = 5.69 months [0.75, 10.64], $P = .02$), 3-month postoperative Karnofsky performance score (MD = 13.59 [11.08, 16.09], $P < .00001$), and 3-month postoperative seizure freedom (odds ratio = 8.72 [3.39, 22.39], $P < .00001$). Furthermore, the awake group had lower 3-month postoperative neurological deficit (odds ratio = 0.47 [0.28, 0.78], $P = .004$) and shorter LOS (MD = -2.99 days [-5.09, -0.88], $P = .005$). In addition, the duration of operation was similar between the groups (MD = 37.88 minutes [-34.09, 109.86], $P = .30$).

Conclusion: Awake craniotomy for gliomas in the eloquent regions benefits EOR, survival, postoperative neurofunctional outcomes, and LOS. When feasible, the authors recommend awake craniotomy for surgical resection of gliomas in the eloquent regions.

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